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DOD 7000.3-G



DEPARTMENT OF DEFENSE

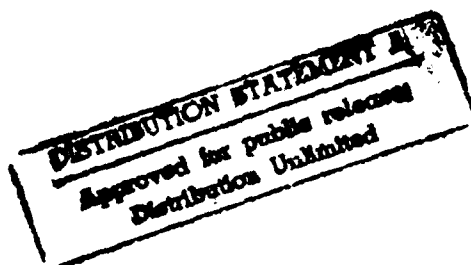
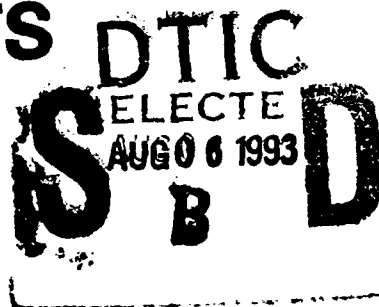
Under Secretary of Defense for
Acquisition (703) 695-5166

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PREPARATION
AND
REVIEW
OF

SELECTED ACQUISITION
REPORTS



93-18171



MAY 1980

OFFICE OF THE ASSISTANT SECRETARY
OF DEFENSE (COMPTROLLER)



COMPTROLLER

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

DoD 7000.3-G

20 MAY 1980

FOREWORD

This guide is issued under the authority of DoD Instruction 7000.3, "Selected Acquisition Reports (SARs)," April 4, 1979.

It is effective immediately and is mandatory for use by all DoD Components. Heads of DoD Components may issue supplementary instructions only when necessary to provide for unique requirements within their respective Components.

Address recommendations for amendments through appropriate channels to:

Director, Management Information Control and Analysis
OASD(Comptroller)
Room 4B915
Pentagon
Washington, D.C. 20301

John R. Quetsch
John R. Quetsch
Principal Deputy Assistant Secretary of Defense
(Comptroller)

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REFERENCES

- (a) DoD Instruction 7000.3, "Selected Acquisition Reports (SARs)," April 4, 1979
- (b) DoD Instruction, 5000.2, "Major System Acquisition Procedures," March 19, 1980
- (c) DoD Instruction 5000.33, "Uniform Budget/Cost Terms and Definitions," August 15, 1977
- (d) DoD 7110-1-M, "Budget Guidance Manual," July 7, 1978, authorized by DoD Instruction 7110.1, August 23, 1968
- (e) MIL STD 881A, "Work Breakdown Structures for Defense Materiel Items," April 25, 1975
- (f) Public Law 85-804, "An Act - To Authorize the Making, Amendment, and Modification of Contracts to Facilitate the National Defense," August 28, 1958
- (g) "Military Equipment Cost Analysis," June 1971, AD901477L

Chapter 1 INTRODUCTION

1-1. PURPOSE

a. Uniform Guidance. This guide provides uniform guidance for the Office of the Secretary of Defense, the Military Departments, and the Defense Agencies (referred to as DoD Components) responsible for implementation of the provisions of DoD Instruction 7000.3, (reference (a)). The instruction addresses three reports: Selected Acquisition Reports (SARs); System Status Reports (Mini-SARs); and the Major Weapon System Acquisition Inventory. Although this guide addresses only SARs, its procedures and general guidance may apply to the other reports.

b. Implementation

(1) The implementation of reference (a), consistent with the guidance described here, will permit uniform interpretation and comparison of all programs designated as major weapon system acquisitions. When supplemental instructions are issued by DoD Components to provide additional guidance to their operations, instructions shall be consistent with the contents of this guide.

(2) The formats prescribed by reference (a) and addressed in this guide need not be treated as forms. These formats may be altered if the required information is presented in a logical and consistent manner.

c. Assistance to Users. This guide is primarily intended to assist those who prepare and review the SARs. However, since the assumptions and computations that underlie the information presented in the SAR are much more complex than might be apparent, all users of SAR data should understand the material in this guide.

1-2. BACKGROUND

a. Reporting Requirements. SARs are standard, comprehensive, summary status reports on major weapon systems for management within the Department of Defense. Reporting will usually be limited to those major system acquisition programs that have reached Milestone II and have been estimated in the Five Year Defense Program (FYDP) to require (1) a total cumulative financing for Research, Development, Test and Evaluation (RDT&E) in excess of \$75 million, or (2) cumulative production investment in excess of \$300 million. Systems not qualifying under these guidelines may also be designated for SAR coverage by the Secretary of Defense. Notification of the Secretary of Defense regarding significant program exceptions, including threshold breaches, will be referenced in the most recent SAR in accordance with DoD Directive 5000.1 (reference (b)). For reporting purposes, SARs submitted to OSD for transmittal to the Congress are considered Congressional SARs. All other SARs are considered non-Congressional SARs.

b. Preparation Difficulties. The most serious difficulties in SAR preparation center on the portrayal of program cost changes. These problems arise primarily because the selection of an appropriate variance category is not always clear, and because computation of the amount attributable to each category can be difficult, especially when multiple related changes occur. Although this guide addresses all aspects of SAR preparation requirements, the problems associated with the portrayal of program acquisition costs and cost variances are emphasized.

1-3. DEFINITIONS

The following definitions apply for all sections of the SAR. Other definitions peculiar to individual SAR sections are defined in the appropriate sections of this guide and in DoD Instruction 7000.3 (reference (a)).

a. Baseline. The value against which variance analysis measurements are made. This will be either a Planning Estimate or a Development Estimate.

b. Planning Estimate (PE). The PE reflects the estimates of operational/technical characteristics, schedule, and program acquisition cost (by appropriation) developed at the time the Secretary of Defense approved program initiation. For SAR purposes, Milestone I will normally be considered as program initiation. A Secretary of Defense Decision Memorandum (SDDM) will normally be the source for the characteristics, schedule, and cost estimates; however, in the absence of a SDDM, the DCP, a draft DCP, Decision Package Set (DPS), Technical Development Plan (TDP), R&D Descriptive Summary, Congressional Data Sheet, FYDP or some similar document or combination of documents may be used. All values should be expressed in terms of goals rather than thresholds. The specific source document used will be identified in the report. Once a PE baseline is established, it will not be changed unless specific prior approval is granted by the Assistant Secretary of Defense (Comptroller) (ASD(C)). The PE will be reflected up to and including the first time the Development Estimate (DE) is reported as the program baseline.

c. Development Estimate (DE). The DE reflects the estimates of operational/technical characteristics, schedule and program acquisition cost (by appropriation) developed at the time full-scale engineering development is initiated (Milestone II). The SDDM will be the source for the characteristics, schedule, and cost estimates; in the absence of an SDDM, other documents may be used (see paragraph 1-3.b.) and should be identified in the report. All values should be expressed in terms of goals rather than thresholds. The DE will supersede the PE as the program baseline the first time the DE is reported. However, the first report containing the DE will include both the PE and the DE and provide a one-time variance analysis of the differences between the PE and the DE. Once a DE baseline is established, it will not be changed unless specific prior approval is granted by the ASD(C).

d. Inventory Objective. The Inventory Objective is the total number of units a DoD Component intends to buy through the life of the program as approved by the Secretary of Defense. This objective may extend beyond the FYDP years but shall be consistent with the program found in the FYDP, unless otherwise directed.

e. Current Estimate (CE). The CE is a DoD Component's latest forecast of operational/technical characteristics, schedule and program acquisition cost to acquire those quantities, including usage or losses necessary to reach the Inventory Objective. The program acquisition cost CE is based on the approved program.

f. Approved Program. The Approved Program is the operational, technical, schedule, and quantity requirements reflected in the latest SDDM, or any other non-Program Objectives Memorandum (POM) or Program Decision Memorandum (PDM) document reflecting a more current decision of the Secretary of Defense or other appropriate approval authority, e.g., the President's budget and supporting documentation such as Congressional Data Sheets. All values should be expressed in terms of goals rather than thresholds.

1-4. REVISIONS AND ADDITIONS

Persons using this guide are encouraged to submit suggestions for improvements through their individual command and DoD Component SAR focal points.

Chapter 2 SAR FORMATS

2-1. GENERAL

Each SAR will be prepared in a concise summary form with emphasis on new information or significant changes rather than on repetitive data of a historical nature. Each report shall be restricted to approximately 13 pages.

2-2. COVER SHEET

Figure 2-1 is a typical SAR cover sheet. The cover sheet must display the name of the report, the Report Control Symbol, as of date, the program name, classification and declassification information, and an index by format designation.

a. Format G Reference. For those SARs in which variance analyses (Format G) immediately follow their subject sections, only the cost variance analysis should be identified in the index.

b. Format I Reference. The cost-quantity curve (Format I) is not included in the index.

2-3. REFERENCE PAGE (FORMAT A)

Figure 2-2 is a typical reference page. The following information must be displayed.

- a. As of Date. The last calendar day of each calendar quarter.
- b. Designation. Enter the system designation (for example, F-15).
- c. Nomenclature. Enter the system nomenclature (for example, Advanced Tactical Fighter).
- d. Popular Name. Enter the popular name, such as EAGLE.
- e. Mission and Description. Enter a brief description of the major system, including its principal subsystems, and the mission it will perform. Enter the names of major systems this system will replace. If none, so state.
- f. Related Programs. Identify related programs; such as any program that is directly affected by changes in the program's cost, schedule, operational/technical characteristics, or any program that could directly impact the cost, schedule, or operational/technical characteristics of the subject system. Programs identified should include programs of other DoD Components and other SAR programs.

FIGURE 2-1

REPORT COMPOSITION COVER SHEET

PROGRAM ACQUISITION COSTS		
SCHEDULE MILESTONES		
OPERATIONAL & TECHNICAL CHARACTERISTICS		
SUMMARY		
REFERENCE PAGE		
REPORT AS OF:		
SELECTED ACQUISITION REPORT		
(RCS DD-COMP(Q)823)		
PROGRAM : _____		
SECTION	INDEX	PAGE
A REFERENCE PAGE	SUBJECT	
B SUMMARY		
C OPERATIONAL/TECHNICAL CHARACTERISTICS		
D SCHEDULE MILESTONES		
E PROGRAM ACQUISITION COST		
F CONTRACTOR COST		
G VARIANCE ANALYSIS		
H BUDGET YEAR AND OUT YEAR PROGRAMS		

FIGURE 2-2

FORMAT A. REFERENCE PAGE

SELECTED ACQUISITION REPORT				RCS 00 COMP(1022)
SYSTEM A 11				
A				
1	AS OF DATE			SUBMISSION DATE
2	DESIGNATION A 11			
3	NOMENCLATURE	Specialized Close Air Support Aircraft		
4	POPULAR NAME	None		
5	MISSION AND DESCRIPTION			
<p>The A 11 is a twin turboprop aircraft specifically designed to provide a Close Air Support capability composed of Close Supporting Fire, Armed Escort and Armed Reconnaissance in a battle area involving anti-tank and anti-mechanized vehicle operations in close proximity to friendly ground forces. The A 11 is capable of carrying up to 16,000 pounds of external load as well as a 30mm rapid fire high velocity gun and will be used by the Tactical Air Command. It will be equipped with low cost avionics. It will be the first Air Force aircraft specifically designed for the close air support of friendly ground forces.</p>				
6	RELATED PROGRAMS None			
7	PRIME CONTRACTORS	ABC Industries, Inc.	ENGINE	General Engine Co.
		ABC Aircraft Company		Aircraft Engine Group
		New York, New York		Philadelphia, PA
8	DDO COMPONENT U S Air Force			
9	RESPONSIBLE OFFICE, PHONE NUMBER AND PROGRAM MANAGER			
	A 11 Program Office			
	Aeronautical Systems Division			
	Wright Patterson AFB, Ohio 45433			
10	REFERENCES			
SECTION C Development Estimate - Decision Coordinating Paper (DCP) 99, 10 February 1975				
Approved Program - Decision Coordinating Paper (DCP) 99, 10 February 1975				
SECTION D Development Estimate - Decision Coordinating Paper (DCP) 99, 10 February 1975				
Approved Program - Decision Coordinating Paper (DCP) 99, 10 February 1975				
SECTION E Development Estimate - Defense Systems Acquisition Review Council (DSARC)				
June 1973, DEPSECDEF memorandum 4 July 1974, and Decision Coordinating Paper (DCP) 99, 10 February 1975				

MISSION AND DESCRIPTION

Includes:

Brief description of system being replaced and effect on other systems

REFERENCES

Includes:

Identification of specific baseline approval documents

g. Contractor Names. Enter the names, division, and plant location of the major prime and associate prime and major subcontractors and indicate the major system or subsystem produced by each. This entry includes but is not limited to those contractors responsible for the contracts identified in Format F, Contractor Cost.

h. DoD Component. Enter the responsible DoD Component. Also, identify participating DoD Components for joint programs.

i. Responsible Office and Phone Number. Enter the DoD Component's office and project manager's name, date of assignment, and phone number (include area code or AUTOVON number).

j. References. Summarize references used in each section of the SAR for PE/DE, CE, and the Approved Program. These references should clearly identify the SAR sections to which they apply. The numbers of the RDT&E Program Elements included in the CE of Program Acquisition Cost will be identified. Also, identify project numbers when the entire Program Element is not included. One copy of each referenced document will be submitted to the ASD(C) with the initial SAR submission. When a reference is changed or added, a copy of the document will be submitted with the first SAR in which the reference appears. For references other than SDDMs that exceed 10 pages or include systems other than the subject SAR system, such as the President's budget, only the cover page and appropriate sections need be submitted.

2-4. SUMMARY PAGE (FORMAT B)

Figure 2-3 is representative of a typical summary page. The page contains the information described below.

a. Program Highlights. In the first paragraph, briefly summarize significant developments from program inception to date. This paragraph should be limited to one-half page if possible. The remaining paragraphs should focus on major events and changes since the previous report and their implications. These paragraphs should include:

(1) A brief summary of the significant developments in the program, including the current status of the related systems and key subsystems identified in paragraphs 2-3 and 2-3.f. except for those covered by separate SARs. Include those items typically addressed in the RDT&E Descriptive Summaries (e.g., information contained in the Program Accomplishments and Test and Evaluation Sections) and Congressional Data Sheets. Some examples include:

(a) Changes that require prior approval reprogramming.

FIGURE 2-3

FORMAT B. EXECUTIVE SUMMARY

3. (U) DECISION COORDINATING PAPER (DCP) THRESHOLDS BREACHED: DCP 385B, JULY 4, 1976. THE INITIAL OPERATING CAPABILITY (IOC) HAS BEEN DELAYED 12 MONTHS, EXCEEDING THE DCP THRESHOLD BY 4 MONTHS. THIS CHANGE IS DUE TO A REVISION IN THE PROCUREMENT PROGRAM STRUCTURE. OUSDR&E WAS NOTIFIED OF THIS PROGRAM CHANGE IMPACT BY MEMO DATED 25 DEC 77.

SUMMARY

SYSTEM: AS OF DATE:

B.

1. PROGRAM HIGHLIGHTS

2. CHANGES SINCE "AS OF" DATE

3. DCP THRESHOLDS BREACHED

(b) Changes resulting from Defense System Acquisition Review Council (DSARC) meetings, SDDMs, or other specific Secretary of Defense approvals that impact the out year program.

(c) When the results of test and evaluation dictate that additional testing is required prior to production, thus delaying the planned procurement.

(d) When weapon system testing initially planned to be completed prior to a DSARC decision is not completed.

(e) Significant Development Test and Evaluation (DT&E), Initial Operational Test and Evaluation (IOT&E), and Operational Test and Evaluation (OT&E) results during the reporting period, including major discrepancies found and remedial actions taken or planned.

(f) Contract activity, including awards, major changes, and significant claims.

(2) An assessment of the extent to which the system is expected to satisfy its current mission requirement, identifying those areas where it will fall short.

b. Changes Since As Of Date. Enter any significant changes in the program that have occurred since the as of date.

c. DCP Thresholds Breached. Enter the date of the latest SDDM or the number and date of the approved DCP (if applicable). Identify the submission date to OSD and current status of any formally submitted draft DCP or DCP change. State whether any program thresholds have been or are estimated to be breached and what threshold is being breached. Reference the means by which OSD has been previously notified of the breach of threshold. If no SDDM or DCP is available, state reason.

2-5. TECHNICAL SECTION (FORMAT C)

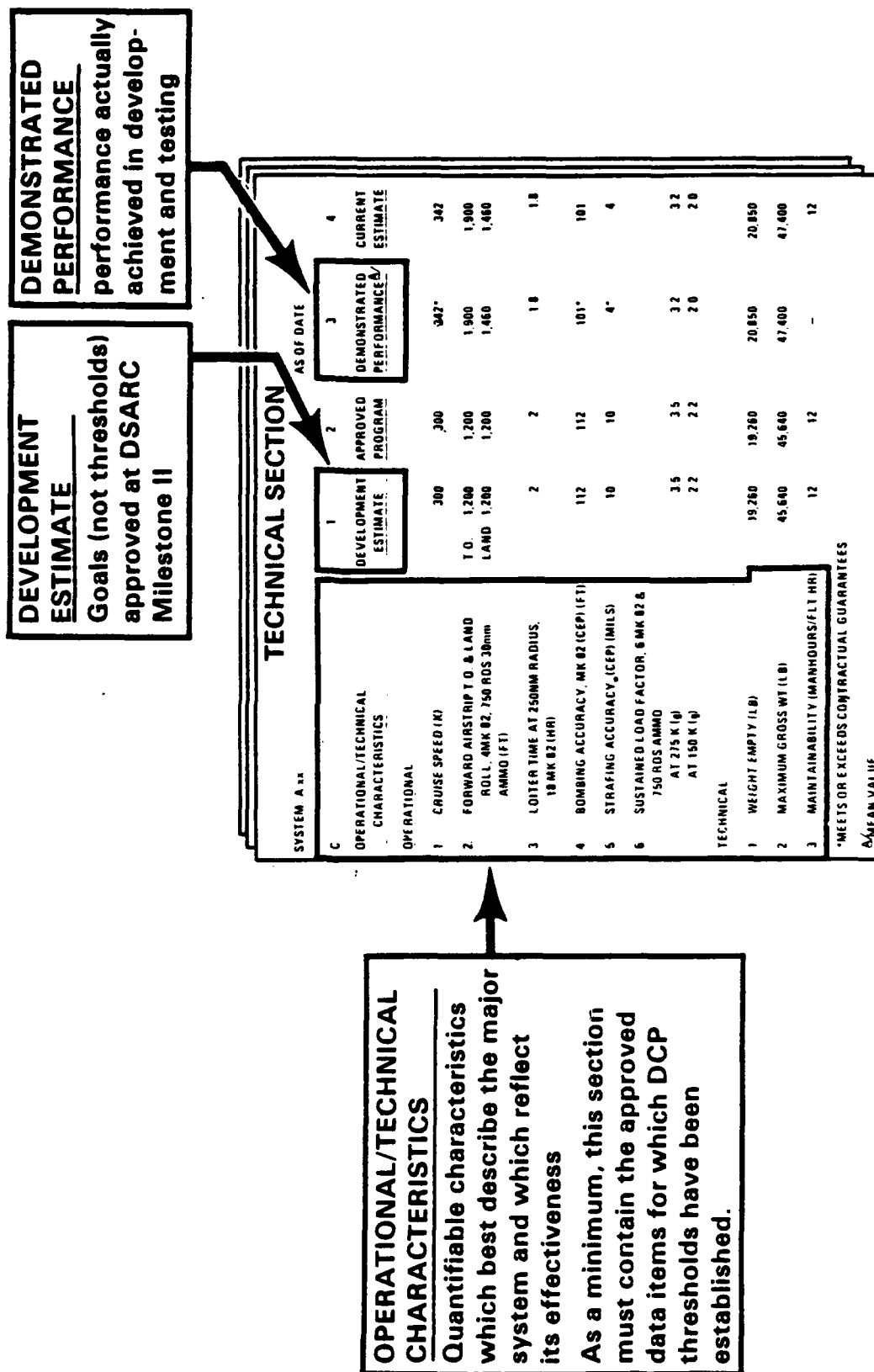
a. General. Figure 2-4 is a typical technical section. The format displays the quantifiable operational/technical characteristics and their units of measure that best describe the major system and that best reflect its expected value and effectiveness in performing the intended military missions.

(1) Indicate changes since the previous submission by the notation "Ch.," plus a sequential number, covering the complete SAR, in parentheses immediately to the right of the changed data: (Ch. 1), (Ch. 2).

(2) Restart the number sequence with each report.

FIGURE 2-4

FORMAT C. OPERATIONAL/TECHNICAL CHARACTERISTICS



b. Operational/Technical Characteristics. Display those characteristics or which SDDM or approved DCP (if applicable) thresholds exist, principal performance requirements of the contract, meaningful characteristics pertaining to key subsystems, and any other characteristics considered significant. All values will be in terms of goals, not thresholds. When successive goals are established for the same characteristic, show the last goal for which a threshold is established. As required and with OSD approval, update the list to incorporate changes in requirements. Updates will generally be limited to additions to the data element list. Demonstrated performance and CE entries will be maintained for data elements for which an approved program entry is no longer appropriate unless the characteristic is no longer meaningful or demonstrable. This requirement is intended to maintain the integrity of the baseline. Data elements added after the SAR baseline is established will enter "N/A" under the PE/DE column unless the addition is contained in the baseline reference document.

(1) Planning Estimate. Enter the operational/technical characteristics and their originally intended values as contained in the PE. The PE will be reflected up to and including the first time the DE is reported as the program baseline.

(2) Development Estimate. Enter the specific characteristics as shown in or based on the DE.

(3) Approved Program. Enter the currently approved characteristics.

(4) Demonstrated Performance. Enter, for each data element being reported, that value relative to the goal actually achieved in the development and testing program. Values will ordinarily be determined in accordance with the approved program test and evaluation plan. In the absence of a formal test plan, the value determination will be the best objective measure of technical progress as determined by the project manager. The results of advanced development testing will be displayed until engineering development data is available. If a demonstrated performance value represents achievement of contractual guarantees, asterisk (*) and footnote that value accordingly.

(5) Current Estimate. Enter the DoD Component's CE of the value of each of the characteristics at completion of development.

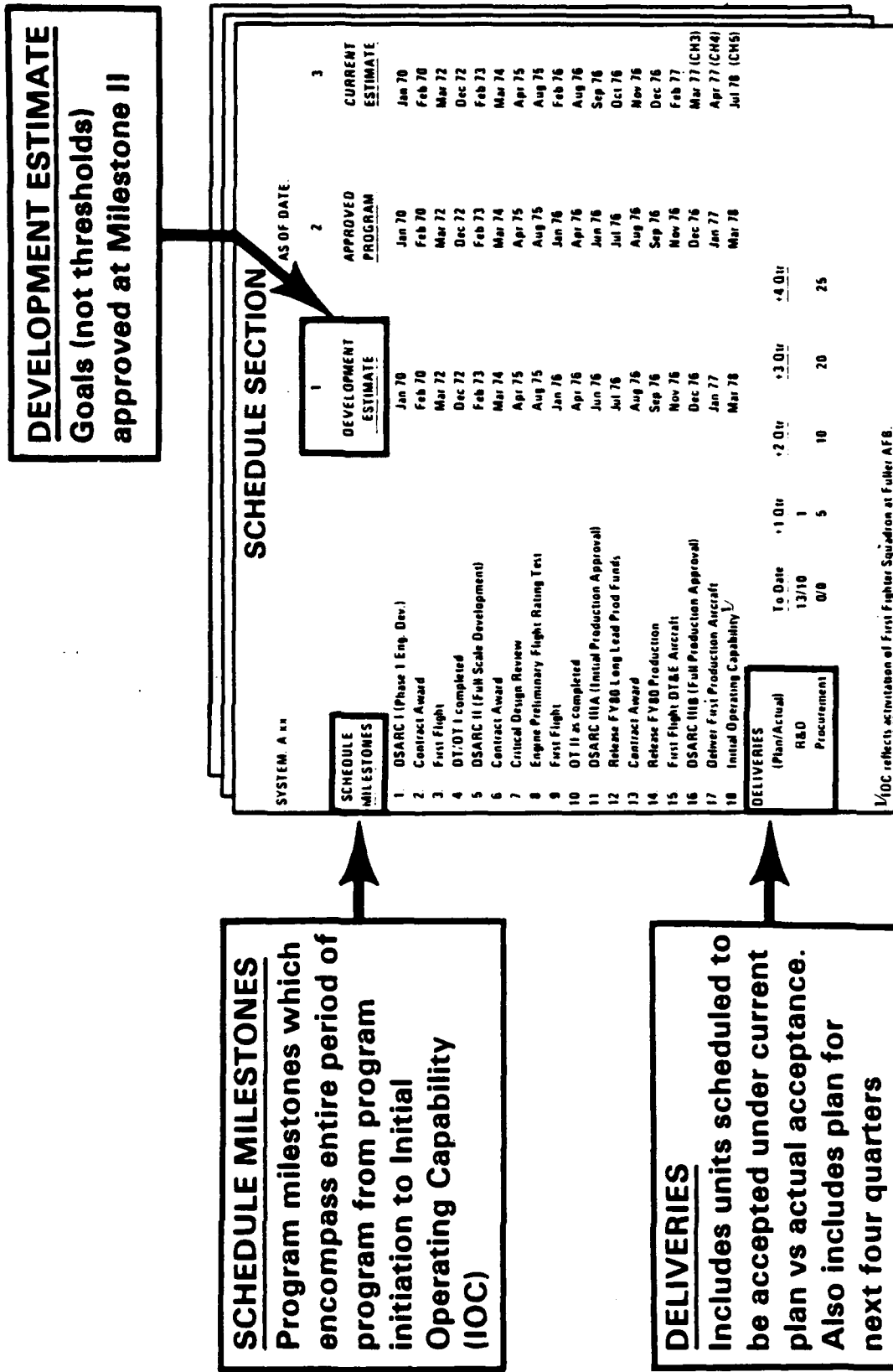
2-6. SCHEDULE SECTION (FORMAT D)

a. General. Figure 2-5 is a typical schedule section. It displays the approved key milestones and actual completion dates.

(1) Indicate changes since the previous submission by the notation "Ch.," plus a sequential number, covering the complete SAR, in parentheses immediately to the right of the changed data: (Ch. 3), (Ch. 4).

FIGURE 2-5

FORMAT D. SCHEDULE MILESTONES



(2) Restart the number sequence with each report.

b. Schedule Milestones. As a minimum, include the milestones listed in the SDDM or approved DCP (if applicable) and the RDT&E Descriptive Summary. All values will be in terms of the established goals, not thresholds. Milestones should encompass the entire period from program initiation (that is, first year of funding encompassed by the program acquisition cost displayed in Format E) through the end of the research and development phase and should include Initial Operational Capability (IOC) and award of the first full-scale production contract. Footnote the program definition of IOC. As was the case for operational/technical characteristics in paragraph 2-5.b., updates will normally be limited to additions and approved program and CE entries will be maintained when appropriate.

(1) Planning Estimate. Enter the completion date for each milestone as shown in, or based on, the PE. The PE will be reflected up to and including the first time the DE is reported as the program baseline.

(2) Development Estimate. Enter the completion date for each milestone as shown in, or based on, the DE.

(3) Approved Program. Enter the completion date for each milestone as shown in, or based on, the currently approved program.

(4) Current Estimate. Enter completion dates that have actually occurred or the DoD Component's estimated completion dates for events that have not yet occurred.

c. Units Accepted to Date (Plan/Actual). This part of the schedule section shows the status of accepted deliveries to date and the planned acceptances for the next 12 months.

(1) Enter the units scheduled to be accepted under the current plan. The current plan is that upon which the CE of Program Acquisition Cost (Format E) is based and will include a projection, by quarter, for the next four quarters. Identify the specific kind of unit, such as prototype, engineering and flight test articles, pilot production, and production. Include in the R&D quantity advanced development and engineering development items to the extent such quantities are included in the program acquisition cost estimate and displayed in the Quantities section of Format E.

(2) Enter the units actually accepted to date by specific kind. Where units accepted are not ready for intended use, so indicate.

2-7. PROGRAM ACQUISITION COST (FORMAT E)

SAR estimates shall include all program acquisition costs applicable to the approved program regardless of the program's stage of development. Development costs shall be accumulated from the point the major defense

system is designated by title as a Program Element or major project within a Program Element. Construction costs shall include those projects that directly support and uniquely identify with the system. The detailed definition of program acquisition cost is in DoD Instruction 5000.33 (reference (c)). In general, the procurement cost portion of program acquisition cost is reflected in the Weapon System Line Item Listing (Exhibit P-1, Chapter 241, DoD 7110-1-M) (reference (d)) for the weapon system involved, plus its associated initial spares. For Navy shipbuilding programs, outfitting and post delivery costs are also included. In those instances where the P-1 line does not include all procurement costs (per reference (c)), such costs will be identified. The determination of add or nonadd status for such costs will be made at the time the data elements are approved.

a. Cost Estimate Detail. Figure 2-6 is a typical Format E display. It portrays cost estimates and funding requirements for development, procurement, and construction.

(1) Report the required level of cost detail as specified in the program acquisition cost data elements approved by OSD for each weapon system. In general, report Development and Military Construction as one-line entries at the appropriation level. Report Procurement cost in three major increments: flyaway cost, other weapon system cost, and initial spares and repair parts. This breakout will conform to the definitions in reference (c). The level of aggregation required within each major increment will be tailored to the particular program being reported.

(a) As a minimum, the flyaway cost increment will be subdivided to reflect those hardware items for which unit costs are reported.

(b) The detailed flyaway data elements such as airframe should be in terms of the appropriate MIL STD 881 (reference (e)) definitions.

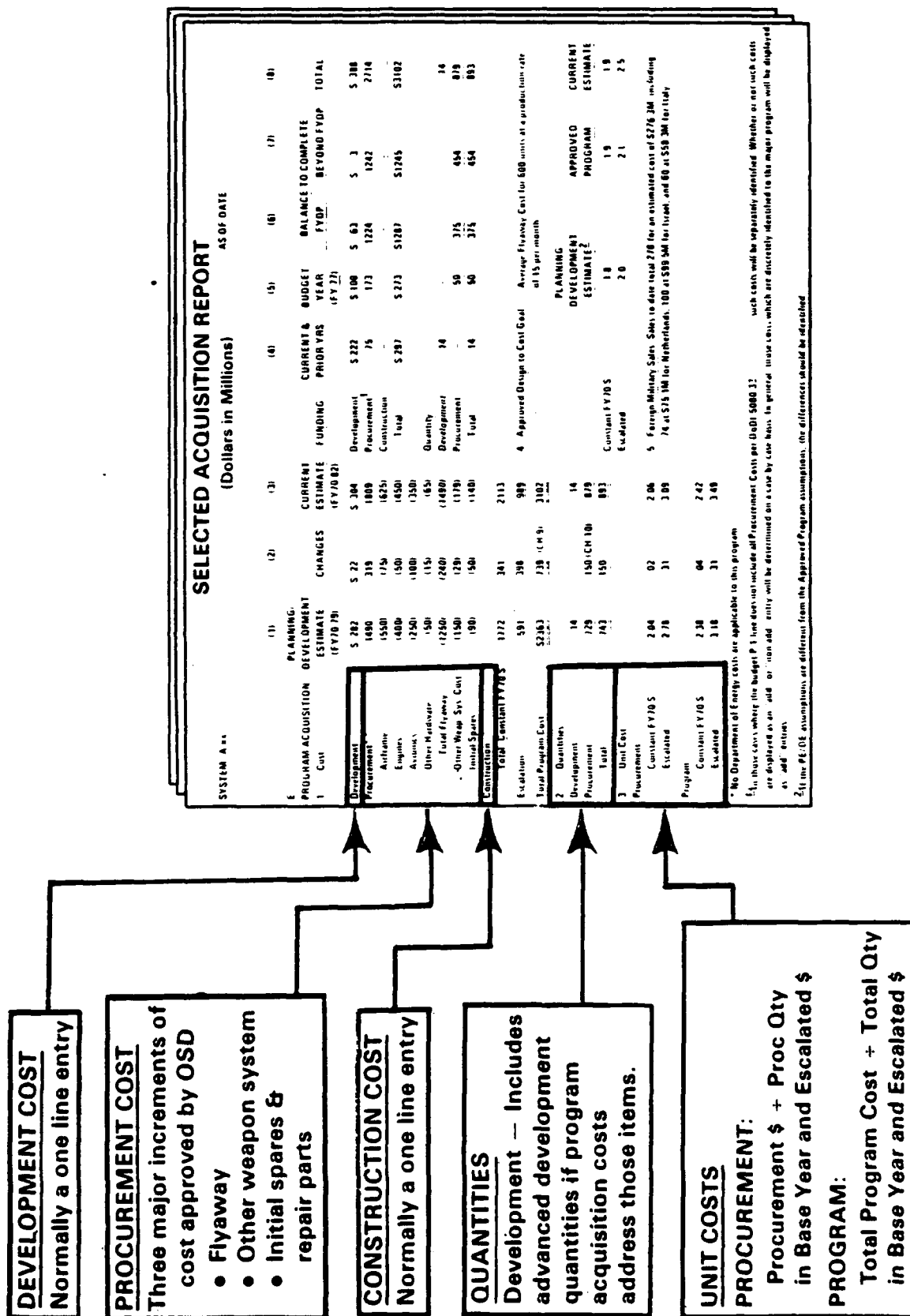
(c) Flyaway data elements should be directly derived from the information portrayed in Format I, Cost-Quantity Curves.

(2) Indicate changes since the previous submission by the notation "Ch.," plus a sequential number, covering the complete SAR, in parentheses immediately to the right of the changed data: (Ch. 5), (Ch. 6). Restart the number sequence with each report. Care should be taken to use the minimum change notations necessary. In general, noting changes in totals is sufficient.

b. Planning Estimate/Development Estimate (column 1, figure 2-7). Enter the baseline estimate for the particular system. The PE will be reflected up to and including the first time the DE is reported as the program baseline. Also, head the column appropriately with the years

FIGURE 2-6

FORMAT E. PROGRAM ACQUISITION COST



of the program as determined by the funding profile associated with the program acquisition cost shown. Show program acquisition costs for development, procurement (in terms of total and the data element breakdown currently reported), and construction in program base year constant dollars. The entry for escalation will reflect the amount of economic escalation included at the time of the baseline's approval.

c. Changes (column 2, figure 2-7). Enter the cost variance between the PE or DE and the CE using the approved data elements. The entry for escalation in this column will reflect changes in economic escalation resulting from actual escalation different from that previously assumed, revisions to prior assumptions regarding future escalation, and escalation related to program changes estimated from the base year of the program.

d. Current Estimate (column 3, figure 2-7). Enter the current estimate of the total acquisition cost of the latest approved program, including a provision for experienced and projected escalation. For the December 31 SAR, the CE will agree with the President's budget and supporting documentation, including the FYDP, RDT&E Descriptive Summaries, Congressional Data Sheets, and the Senate Appropriation Committee (SAC) Program Data Book. The cost estimates for subsequent submissions should reflect the latest and best estimate of the cost of the last DoD approved program available to the DoD Component by the as of date for that submission (see paragraph 1-3.f.). Program decisions made since the President's budget via the DCP/DSARC process, reprogramming actions, and Secretary of Defense memoranda will be displayed in subsequent SAR submissions. Program Objective Memorandum (POM) and Program Decision Memorandum (PDM/APDM) documents are excluded on the basis that they do not represent final Secretary of Defense decisions until the budget is submitted to Congress.

(1) Program changes which are exclusively POM/PDM/APDM changes will not be shown. However, this restriction will not be used to exclude actual and projected cost changes simply because such changes are included in the POM/PDM/APDM cycle. When available information indicates the approved program, as defined in paragraph 1-3.f., will cost more than previously estimated, a revised estimate must be shown. This requirement applies even if program changes are proposed in the POM/PDM/APDM that will result in a restructured program and that remain within previously approved funding levels.

(2) Current program acquisition costs for development, procurement (in terms of the total and the data element breakdown therein), and construction will be reflected in program base year constant dollars. The entry for escalation will reflect the amount of experienced and projected escalation, both economic and escalation related to program changes estimated from the program base year, that is included in the CE. This will be the amount reflected for escalation in column 1 plus the changes for escalation reported in column 2.

FIGURE 2-7

FORMAT E. PROGRAM ACQUISITION COST

COLUMN 1
PLANNING/DEVELOPMENT ESTIMATE
Program cost baseline established at time of program approval (program initiation or Milestone II)

COLUMN 2
CHANGES
Differences between the PE/DE and the CE

COLUMN 3
CURRENT ESTIMATE
The total acquisition cost for the latest approved program, including provisions for escalation (experienced and projected)

SELECTED ACQUISITION REPORT									
(Dollars in Millions)									
AS OF DATE									
SYSTEM A-11	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
PROGRAM ACQUISITION	PLANNING/DEVELOPMENT ESTIMATE (FY 78-79)	CHANGES	CURRENT ESTIMATE (FY 78-79)	CURRENT & PRIOR YRS	BUDGET YEAR (FY 79)	BALANCE TO COMPLETE FY 79	BEYOND FY 79	TOTAL	
Development/Procurement	\$ 272	\$ 22	\$ 294	\$ 222	\$ 100	\$ 63	\$ 3	\$ 388	
Procurement	185	319	185	75	173	1224	1242	2714	
Avionics	(550)	(75)	(625)						
Support	(400)	(50)	(450)	\$ 287	\$ 273	\$ 1287	\$ 1245	\$ 3102	
Avionics	(250)	(100)	(350)						
Other Hardware	(50)	(15)	(65)						
Total Flyway	(1750)	(200)	(1950)	14	50	375	454	879	14
Other Weap Sys Cost	(150)	(23)	(173)						
Initial Spares	(90)	(50)	(140)	14	50	375	454	893	
Construction									
Total Current FY 78	1772	341	2113						
Escalation	591	308	899						
Total Program Cost	\$2363	739 (CH 9)	3102						
Development	14		14						
Procurement	179	150 (CH 10)	879						
Total	193	150	343						
3. Unit Cost									
Procurement	2.04	.02	2.06						
Constant FY 78 \$	2.78	.31	3.09						
Escalated									
Program	2.38	.04	2.42						
Constant FY 78 \$	3.18	.31	3.49						
Escalated									

4. Approved Design to Cost Goal: Average Flyway Cost for 600 units at a production rate of 15 per month

5. Foreign Military Sales: Sales to date total 278 for an estimated cost of \$216.3M including 76 at \$15.1M for Netherlands, 100 at \$99.5M for Israel, and 80 at \$58.3M for Italy

6. No Department of Energy costs are applicable to this program

7. In those cases where the budget P 1 line does not include all Procurement Costs per OAD \$408.33 are displayed in an add-on entry will be determined on a case by case basis. In general, those costs which are discretely identified to the major program will be displayed as add-on entries

8. In the PE/DE assumptions are different from the Approved Program assumptions, the differences should be identified

e. Escalation. Show all data element cost entries under development, procurement, and construction in base year constant dollars. To avoid complications, the first year of funding should be established as the base year. In those instances where the base year and the first year of funding encompassed by the program acquisition cost differ, the constant dollar entry will be the sum of prebase year costs, in current dollars, such as actuals, and base year constant dollars for the remainder of the program. The appropriate data elements and constant dollar totals will be footnoted to identify the amount of escalation that must be added to arrive at a true base year constant dollar total. Identify escalation experienced and projected during the spend-out period of the acquisition program. Include both economic escalation and escalation related to program changes, estimated from the base year of the program. DoD policy provides for development of the provision for escalation on the basis of price level indices. Appropriate guidance on the application of price level indices for this purpose will be issued, as required, by separate memorandum from ASD(C). A detailed discussion of escalation and price level indices is contained in Chapter 4.

f. Baseline Changes. Baseline changes will be accomplished only after review and approval by the ASD(C) in coordination with USDR&E and ASD(PA&E). Costs previously excluded from a system's program acquisition cost will be added to the CE when it is determined that such costs are unique to or appropriately chargeable to that system. Where the added costs represent formal requirements that existed at the time the PE or DE was established, the PE or DE may be retroactively adjusted. In such cases, the value added to the PE or DE will be the value in existence at the time of PE or DE approval. Report any difference between the adjusted PE or DE and the CE in the variance analysis, using the variance categories that best explain the difference. When previously included costs are determined to be no longer unique to or appropriately chargeable to the system, their deletion will be similarly treated (applies only when the subject goods or services are to be budgeted elsewhere). When changing the PE or DE is inappropriate, the addition will be made only to the CE and will be reflected in the variance category that best explains the difference (see subparagraph 3-2.f.(2)).

g. Quantities (figure 2-6). This section indicates the quantities of development and procurement units, including advanced development quantities, to the extent such quantities are included in the program acquisition cost. Enter all quantities immediately below the related cost estimate. If the DoD Component is acting as the procuring agent for other domestic users, show the additional quantities, their acquisition cost, and changes in a manner similar to the FMS display requirements (see paragraph 2-7.k.).

(1) Planning Estimate/Development Estimate (column 1). Enter the total quantities included in the PE or DE.

(2) Changes (column 2). Enter the quantity variance between the PE or DE and the CE.

(3) Current Estimate (column 3). Enter the total quantities included in the CE. This should be the quantity represented by the Inventory Objective.

h. Unit Costs (figure 2-6). Divide the procurement quantities into the procurement costs and total quantities into the program costs for the procurement unit cost and program unit cost, respectively. Enter these unit costs in the applicable PE/DE and CE columns. Use the breakdown between development and procurement escalation shown in Format G, Cost Variance Analysis, for both the PE/DE and the CE to compute the unit cost with escalation for procurement and program unit cost figures. For those programs that produce more than one end item, such as air defense missile systems, a single grouping of equipment will be established as a common denominator for calculation of procurement and program acquisition unit costs in accordance with DoD Instruction 5000.33 (reference (c)). Such groupings will normally represent the smallest organizational or operational configuration necessary for a fully operational system. If, in addition, unit costs are required for one or more end items, such as missile and launch, the costs will be identified and displayed as flyaway unit costs and will be determined by dividing the item quantity into the appropriate cost data elements (see paragraph 2-7.a.(1)).

i. Funding (figure 2-8). By appropriation, enter in the appropriate columns that portion of the CE (including escalation) that is currently programmed for current and prior fiscal years, the budget year, the remainder of the FYDP period, and the amount required to complete the program. When more than one procurement appropriation is included, each will be displayed separately, such as aircraft, missile, ship, and other.

(1) Current and Prior Years (column 4). Enter that portion of the CE that has been appropriated by the Congress for the current fiscal year and for all years before to the current year, plus or minus approved reprogramming actions, including reprogramming requests officially forwarded to Congress but not acted upon. Adjustments should be made for those years that have lapsed to the obligations level.

(2) Budget Year (column 5). Enter that portion of the CE approved by OSD for inclusion in the last President's budget. To avoid confusion, identify the budget year in parentheses, e.g., (FY 77). Except for approved reprogramming, apportionment, or budget amendment actions, a new budget year cost will not be reported until a new President's budget is submitted. If the signed appropriation bill differs from the amount displayed, footnote the appropriated amount. An assessment of significant program impact of such differences will be highlighted in Format B.

(3) Balance to Complete (columns 6 and 7):

(a) FYDP (column 6). Enter that portion of the CE that is necessary to complete the remainder of the FYDP period. Except for the December 31 SAR, this entry need not agree with any specific published FYDP (see paragraphs 2-7.d. and 2-7.d.(1)).

FORMAT E. PROGRAM ACQUISITION COST

2-17

(b) Balance (column 7). Enter that portion of the CE that is necessary to complete the program beyond the FYDP (i.e., the difference between the CE and the sum of (1), (2), and (3)(a) above). Except for December 31 SAR, this entry need not agree with any specific published FYDP.

(4) Total (column 8). Enter the total of columns 4 through 7.

j. Design-to-Cost Goal (figure 2-9). Show Design-to-Cost information in a separate, nonadd entry. The entry is nonadd in that values need not be derived directly from the information in columns 1 and 3 of Format E. Include the original goal, present (approved) goal, and the project manager's Current Estimate. All entries will be in constant and current dollars and will be expressed as an average unit flyaway, sailaway, etc., per DoD Instruction 5000.33 and DoD Directive 5000.28, and will specify the assumed production quantity and rate. In those instances where the escalated dollar value is not readily available, it may be approximated and identified as "Approximated for information purposes only."

k. Foreign Military Sales (FMS) (figure 2-9). Programs which involve foreign military sales will display information on the quantity and estimated cost of FMS by recipient country, changes in such data since the previous report, and the schedule and cost impact of such changes on the DoD programs involved. The FMS information will be based on actual FMS cases as evidenced by an accepted DD Form 1513 (Offer and Acceptance), as amended. The reported cost will reflect the amount shown on Line 15, Estimated Cost, of DD Form 1513. Report the FMS data in the form of nonadd, information entries. Show the applicable schedule and cost impact of FMS on the DoD program, by appropriate variance category, in Format G, Cost Variance Analysis.

l. Nuclear Costs (figure 2-9). Reflect costs for associated nuclear armament and propulsion as a separate, nonadd entry.

2-8. CONTRACTOR COSTS (FORMAT F)

Contractor cost information (figure 2-10) (cost to the Government) will be separately reported for all active prime and associate prime contracts valued in excess of \$5 million. Limit each report to the six largest contracts. Identify each contract by number, type, date, and whether a letter or definitized contract is in effect. Where appropriate, entries will be based on information contained in the latest contractor cost and performance reports. The as of date should be noted when it differs from the SAR date. Report development, procurement, and construction contract information separately. Indicate changes since the previous submission by the notation "Ch.," plus a sequential number covering the complete SAR, in parentheses immediately to the right of the changed data, such as (Ch. 7), (Ch. 8). Restart the number sequence with each report.

a. Initial Contract Price. Enter the initial contract (target) price as stipulated in the original contract. Quantities are optional reporting items and are not required.

FIGURE 2-9

FORMAT E. PROGRAM ACQUISITION COSTS

SELECTED ACQUISITION REPORT									
(Dollars in Millions)									
SYSTEM A **	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
PROGRAM ACQUISITION	PLANNING/	CHANGES	CURRENT	CURRENT & BUDGET	BALANCE TO COMPLETE				
J Cost	DEVELOPMENT		ESTIMATE	PRIOR YRS	FYDP	BEYOND FYDP	TOTAL		
	ESTIMATE		(FY 70-82)	(FY 73)					
	(FY 70-79)								
Development /	\$ 282	\$ 22	\$ 304	\$ 222	\$ 103	\$ 3	\$ 308		
Procurement 1/	1496	319	1609	75	173	1242	2714		
Airframe	(1550)	(75)	(625)						
Engines	(4000)	(50)	(4050)						
Avionics	(2500)	(100)	(2600)	\$ 297	\$ 273	\$ 1245	\$ 3102		
Other Hardware	(150)	(115)	(65)						
Total Flyaway	(12500)	(240)	(12740)	14			14		
Other Weap Sys Cost	(1500)	(29)	(1529)		50	375	454		
Initial Spares	(90)	(50)	(140)	14	50	375	454		
Construction									
Total Constant FY 70 \$	1772	341	2113						
Escalation	591	398	989						
Total Program Cost	\$2363	739 (CH 9)	3102						
2 Quantities	14		14						
Development	729	150 (CH 10)	879						
Procurement	703	150	853						
Total									
3 Unit Cost									
Procurement	2 04	02	2 06						
Constant FY 70 \$	2 76	31	3 09						
Escalated									
Program									
Constant FY 70 \$	2 38	04	2 42						
Escalated	3 18	31	3 49						

4 Approved Design to Cost Goal Average Flyaway Cost for 600 units at a production rate of 15 per month

PLANNING/	APPROVED	CURRENT
DEVELOPMENT	PROGRAM	ESTIMATE
ESTIMATE 2	19	19
Constant FY 70 \$	2 1	2 5
Escalated		

5 Foreign Military Sales Sales to date total 218 for an estimated cost of \$276.3M, including 74 at \$75.1M for Netherlands, 100 at \$99.5M for Israel, and 60 at \$58.3M for Italy

6 No Department of Energy costs are applicable to this program

7 In those cases where the budget P 1 line does not include all Procurement Costs per DODI 5000.33, such costs will be separately identified. Whether or not such costs are displayed as an "add" or "non add" entry will be determined on a case by case basis. In general, those costs which are discretely identified to the major program will be displayed as "add" entries

8 If the PE/DIS assumptions are different from the Approved Program assumptions, the differences should be identified

DESIGN-TO-GOAL
Displays original goal, present goal and PM's current estimate

FOREIGN MILITARY SALES
Provides quantity & estimated cost of FMS by recipient country

NUCLEAR COSTS
Shows cost of nuclear armament or propulsion systems

b. Current Contract Price:

(1) Target. Enter the current contract target price: the sum of the initial contract price, definitized changes, and the estimated price of authorized but undefinitized changes. Quantities are optional reporting items and are not required.

(2) Ceiling. Enter the current contract ceiling price: the sum of the initial ceiling price, the ceiling price of definitized changes, and the estimated ceiling price of authorized but undefinitized changes.

c. Price at Completion:

(1) Contractor Estimate. Enter the contractor's current estimated price at completion of all authorized work. Include expected incentives and the Government's share of expected over or under target amounts.

(2) Government Estimate. Enter the Government's independent assessment for paragraph C.(1), above. Show parenthetically the total dollar value of planned changes as yet unauthorized to the contractor, such as \$217.5M (\$22.3M). The data in parentheses need not be reported if disclosure of this information would jeopardize the Government's negotiating position. Provide specific justification for such deletions separately, such as in the SAR transmittal memorandum.

2-9. VARIANCE ANALYSIS (FORMAT G)

Briefly summarize explanations of significant variances between designated columns of information within the prescribed technical, schedule, and cost tables, as indicated below. The thrust of the variance analysis is a summary explanation of changes between the DE or PE and the CE, with a more detailed explanation of the identified changes since the previous report. Changes since the previous report will identify the magnitude of the change. All change explanations should explicitly identify why the change occurred. For example, reprogramming action explains how the change occurred but additional flight testing explains why the change occurred. Specifically identify any estimate that will breach a SDDM, DCP, or other OSD threshold. The variance analysis may be provided at the end of each section (technical, schedule, and cost) or in a separate section at the end of the report. A one-time analysis of the differences between the PE and the DE will accompany the submission of the first report containing the DE. A copy of the program acquisition cost variance analysis will be included in each subsequent report.

a. Operational/Technical Characteristics and Schedule Milestones (figure 2-11). Explain, in brief summary form, the significant variances between the DE/PE and the CE and the identified changes since the previous submission. The variance summary for formats C and D should be followed by the explanation of changes since the previous report. The change explanation should identify the amount of the change, such as +50 ft CEP or +2 months.

FIGURE 2-10

FORMAT F. CONTRACTOR COST SECTION

PROVIDES:

- Initial and current contract price and quantity
- Contractor and government estimated price at completion

for

Six Largest Contracts

CONTRACT INFORMATION SECTION									
SYSTEM A-11		1		2		3		AS OF DATE	
F.		INITIAL CONTRACT		CURRENT CONTRACT PRICE ^A		PRICE AT COMPLETION			
		CONTRACTOR COSTS	PRICE	QTY	CEILING	TARGET	QTY	CONTRACTOR ESTIMATE ^A	GOVERNMENT ESTIMATE
DEVELOPMENT									
1. ABC AIRCRAFT									
			\$150.3	10		\$171.5	6	\$181.5	\$217.5(22.3)
3. GENERAL ENGINE									
			\$ 27.7	32		\$ 24.2 (Ch 15)	20	\$ 23.3 (Ch 16)	\$ 24.2 (Ch 17)
PROCUREMENT									
1. ABC AIRCRAFT									
			\$110.3	48		\$180.6 (Ch 18)	52	\$208.8 (Ch 19)	\$212.4 (Ch 20)
2. ABC AIRCRAFT									
			\$136.3	43		\$147.3	43	\$147.3	\$160.1
3. GENERAL ENGINE									
			\$ 59.3	124		\$ 58.8	130	\$ 65.1	\$ 75.9(10.2)
4. GENERAL GUN									
			\$ 13.2	48		\$ 23.8	52	\$ 23.3	\$ 24.7
CONTRACT IDENTIFICATION									
1. ABC AIRCRAFT									
						CONTRACT NO F3365774C 0000			COST PLUS INCENTIVE FEE, DEFINITIZED (DEVELOPMENT) FPIF, DEFINITIZED (PROG)
2. ABC AIRCRAFT									
						CONTRACT NO F3365776C 0010			FIXED PRICE INCENTIVE FIRM, DEFINITIZED (PROCUREMENT)
3. GENERAL ENGINE									
						CONTRACT NO F3365774C 0020			FIXED PRICE INCENTIVE FIRM, DEFINITIZED (DEVELOPMENT AND PROCUREMENT)
4. GENERAL GUN									
						CONTRACT NO F3365774C 0030			FIXED PRICE INCENTIVE FIRM, DEFINITIZED (PROCUREMENT)

^A CONTRACT PRICES AND CONTRACTOR ESTIMATES OBTAINED FROM THE CONTRACTOR COST PERFORMANCE REPORTS AVAILABLE 30 SEPTEMBER 1976

FIGURE 2-11

FORMAT G. TECHNICAL & SCHEDULE VARIANCE

VARIANCE EXPLANATION SHOULD:

- Describe nature of the problem
- Give reasons for the variance
- Provide immediate program impact
- Provide impact on total program
- State any corrective action
- Be commensurate with degree & severity of variance

SYSTEM: A-10				AS OF DATE:			
OPERATIONAL/TECHNICAL CHARACTERISTICS		DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE ^a	CURRENT ESTIMATE		
OPERATIONAL							
1. CRUISE SPEED (K)		300	300	342*	342		
2. FORWARD AIRSTRIP T.O. & LAND ROLL, 4MK 82, 750 RDS 30mm AMMO (FT)		T.O. 1,200 LAND 1,200	1,200 1,200	1,400	1,400		
3. LOITER TIME AT 2500MM RADIUS, 10 MK 82 (HR)		2	2	1.8	1.8		
4. BOMBING ACCURACY, MK 82 (CEP) (FT)		112	112	101*	101		
5. STRAFING ACCURACY, (CEP) (MILS)		10	10	4*	4		
6. SUSTAINED LOAD FACTOR, 6 MK 82 & 750 RDS AMMO AT 275 K (g) AT 100 K (g)		3.5 2.2	3.5 2.2	3.2 2.0	3.2 2.0		
TECHNICAL							
1. WEIGHT EMPTY (LB)		19,200	19,200	20,050	20,050		
2. MAXIMUM GROSS WT (LB)		45,640	45,640	47,400	47,400		
3. MAINTAINABILITY (MANHOURS/FLT HR)		12	12	-	-		

*MEETS OR EXCEEDS CONTRACTUAL GUARANTEES.
a/MEAN VALUE

SYSTEM: A-10				AS OF DATE:			
SCHEDULE MILESTONES		DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE			
1. DSARC I (Phase I Eng. Dev.)		Jan 76	Jan 76	Jan 76			
2. Contract Award		Feb 76	Feb 76	Feb 76			
3. First Flight		Mar 72	Mar 72	Mar 72			
4. DT/DTI completed		Dec 72	Dec 72	Dec 72			
5. DSARC II (Full Scale Development)		Feb 73	Feb 73	Feb 73			
6. Contract Award		Mar 74	Mar 74	Mar 74			
7. Critical Design Review		Apr 75	Apr 75	Apr 75			
8. Engine Preliminary Flight Rating Test		Aug 75	Aug 75	Aug 75			
9. First Flight		Jan 76	Jan 76	Jan 76			
10. DT II in completed		Jan 76	Jan 76	Jan 76			
11. DSARC IIIA (Initial Production Approval)		Jan 76	Jan 76	Jan 76			
12. Release FY80 Long Lead Prod Funds		Jul 76	Jul 76	Jul 76			
13. Contract Award		Aug 76	Aug 76	Aug 76			
14. Release FY80 Production		Sep 76	Sep 76	Sep 76			
15. First Flight DT&E Aircraft		Nov 76	Nov 76	Nov 76			
16. DSARC IIIB (Full Production Approval)		Dec 76	Dec 76	Dec 76			
17. Deliver First Production Aircraft		Jan 77	Jan 77	Jan 77			
18. Initial Operating Capability		Mar 78	Mar 78	Mar 78			
DELIVERIES							
(Plan/Actual)		To Date	+1 Qtr	+2 Qtr	+3 Qtr	+4 Qtr	
R&D		12/76	1	10	20	25	
Procurement		0/0	5	10	20	25	

1/10C reflects activation of First Flight Squadron at Fuhler AFB

b. Program Acquisition Costs. Quantify and explain, in brief summary form, the variances between the DE/PE and the CE and the identified changes since the previous submission. The detailed requirements and format for the cost variance analysis are discussed in Chapter 3.

2-10. BUDGET YEAR AND OUT YEAR PROGRAMS (FORMAT H)

This table (figure 2-12) will provide a breakdown, by fiscal year, of the program acquisition cost and escalation applicable to the budget year and balance to complete segments of the CE. By appropriation, enter in the appropriate columns the current program cost for each fiscal year, the estimated amount of escalation included, and the annual escalation rates applicable to each year for the program being reported. Entries should be identified to the specific fiscal year to which they apply and should agree with the amounts reported in the applicable columns of the funding section of Format E, Program Acquisition Cost, for the same date (see figure 2-13). The escalation amounts should include both economic escalation and escalation related to program changes, estimated from the base year of the program. Escalation estimates will take into account the outlay rates applicable to the program concerned for each fiscal year and the compounding effect of prior years' escalation. Identify changes since the previous report and changes in rates previously reported for prior fiscal years and explain by footnote.

2-11. COST-QUANTITY CURVES (FORMAT I)

The cost-quantity curve in program base year constant dollars for both the R&D and production units will be submitted in graphic form with the equation used, or a table showing cost and quantity by fiscal year. This is to be submitted with the first SAR in which the PE or DE is reported. Nonrecurring cost for both the R&D and production units will be separately identified. Where costs must be separately computed for more than one end item of equipment (see paragraphs 2-7.a.(1) and 2.7.h.), cost-quantity curves will be prepared for each end item (support equipment is excluded). Quantity variance will be computed using the appropriate PE or DE cost-quantity curves (see paragraph 3-2.c.). With subsequent SAR submissions, an updated graph or table showing cost and quantity by fiscal year should be submitted displaying the PE or DE curve and the CE curve when a formal program estimate update has been completed or when there has been a cumulative change in flyaway cost, less quantity changes, of 10 percent or more since the last curve update. These updating requirements apply to each reportable end item.

Specific instructions are:

a. The recurring unit cost curve should always be used and should be labeled as such; if a cumulative average curve is also shown, it should be clearly labeled.

FIGURE 2-12

FORMAT H. BUDGET YEAR AND OUT YEAR PROGRAMS

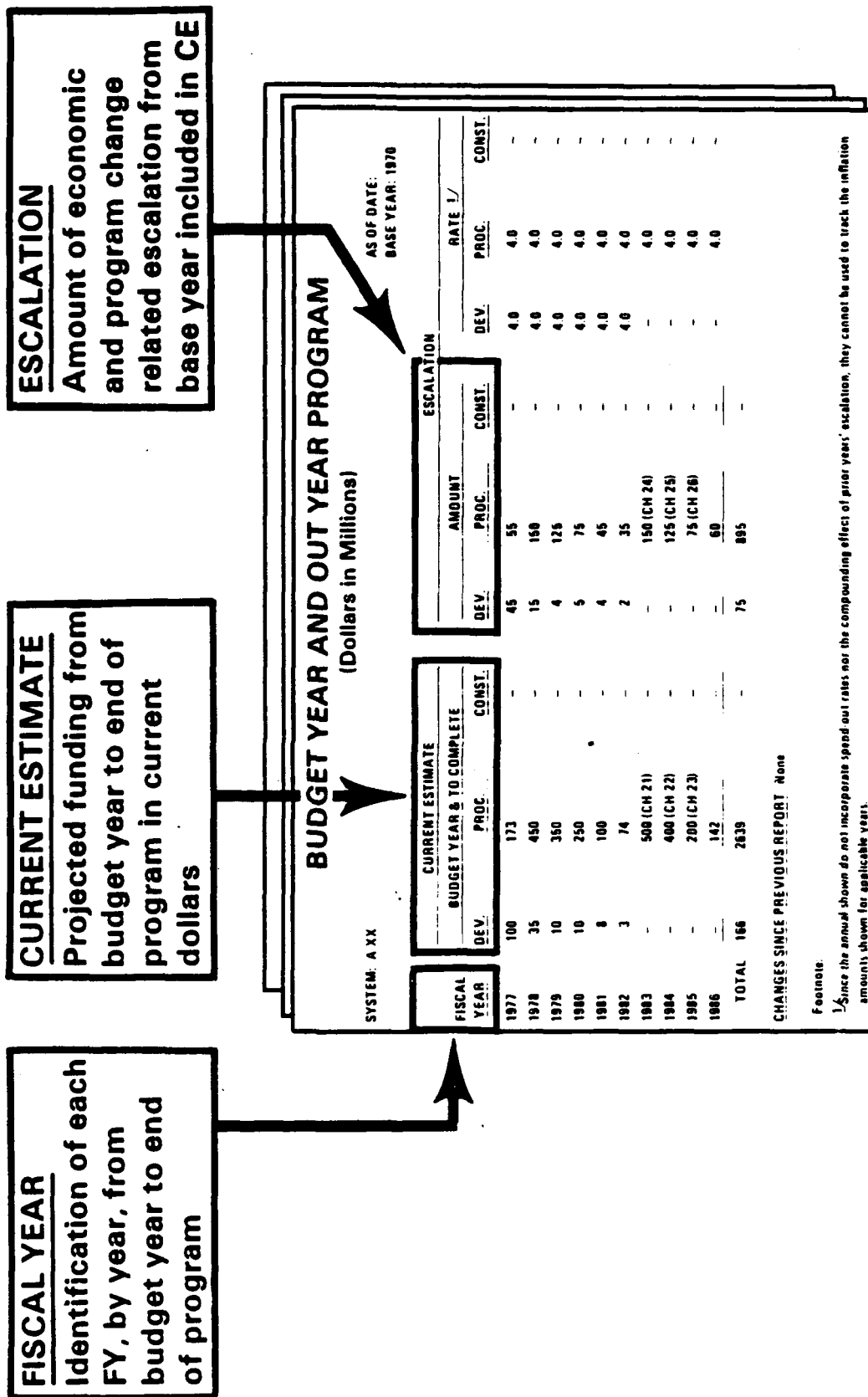


FIGURE 2-13

RECONCILIATION OF COST FORMATS

FORMAT H

BUDGET YEAR AND OUT YEAR PROGRAM (Dollars in Millions)									
SYSTEM: A XX		CURRENT ESTIMATE				ESCALATION			
		BUDGET YEAR & TO COMPLETE				AMOUNT			

b. In the situation where an equation has been used, a statement should be made on the graph as to whether the curve is based on the theory of a log-linear unit or a log-linear cumulative average (see reference (g), Chapter 5).

c. The x and y axes should be clearly labeled.

d. In all cases, the recurring costs for the R&D units should be plotted and labeled on the graph.

e. The graph should be reproducible and readable.

f. The supporting data should include the following:

(1) Documentation should be sufficient to reproduce the cost-quantity curve in order to calculate quantity variance during the life of the program and to independently verify the calculated variances.

(2) Provide the first unit cost and slope of the curve, or the equation. If a curve is not used, then provide the data according to the following table:

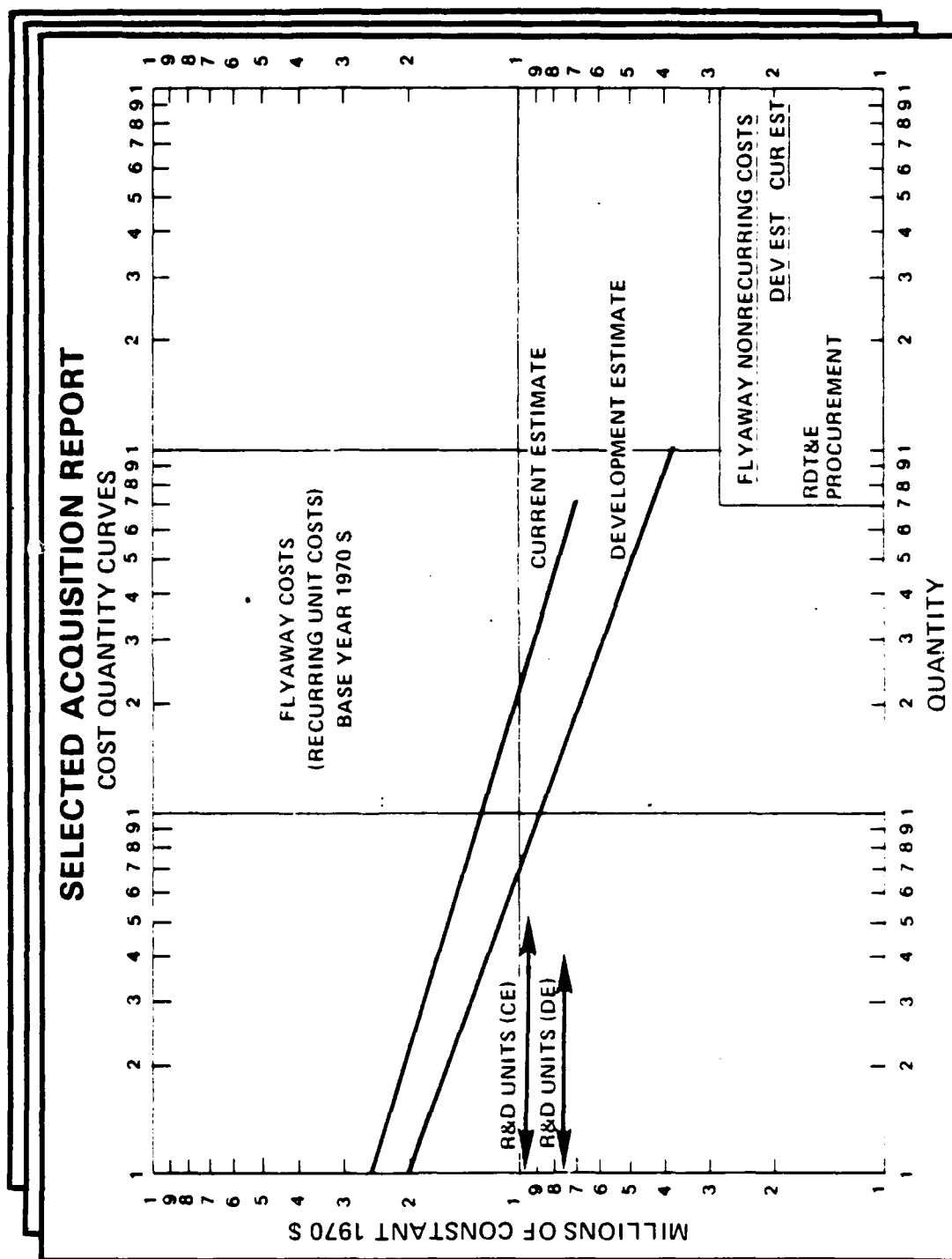
<u>Fiscal</u> <u>Year (FY)</u>	<u>Qty</u>	<u>Total</u> <u>Recurring</u> <u>Cost/FY</u>	<u>Unit</u> <u>Average</u> <u>Cost/FY</u>	<u>Plot</u> <u>Point</u>
-----------------------------------	------------	--	---	-----------------------------

(3) The total nonrecurring and recurring costs must be reconciled to the flyaway cost reported in the SAR.

e. The definitions for nonrecurring and recurring costs should be based on those provided in the Contractor Cost Data Reporting System (CCDR). It should be noted that work breakdown structure elements, systems/project management and systems test and evaluation, are included as part of the RDT&E and production flyaway cost definition. Flyaway costs as defined for procurement should be consistent with reference (c).

FIGURE 2-14

FORMAT I. COST QUANTITY CURVES



Chapter 3
COST VARIANCE ANALYSIS

3-1. GENERAL

a. Definition. Cost variance is the difference between the baseline cost estimate and the CE of program costs. The baseline for the SAR is the DE unless the SAR is submitted prior to Milestone II, in which case the PE is used.

b. Format. Figure 3-1 portrays a typical Format G, Cost Variance Analysis, and the relationship of the cost figures to Format E, Program Acquisition Cost. The cost variances are classified and reported according to the definitions in paragraphs 3-2.a. through 3-2.h. The escalation column will reflect escalation, both economic escalation and escalation related to program changes, estimated from the base year of the program. All other cost data reflected in the Development, Procurement, and Construction columns will be expressed in base year constant dollars. The remarks should explain concisely but completely the cause and circumstances of each change. These remarks may be physically located in the Remarks column or may follow immediately after the table of changes. The explanation of changes since the previous report, Current Changes, should be specific. The explanation of Previous Changes may be more general. The general requirements for each line entry are as follows:

(1) Development Estimate. Enter in the appropriate columns the applicable costs reflected in column 1 of the Program Acquisition Cost section (Format E). The parenthetical entries for escalation reflect the amount of economic escalation included in the PE/DE for each appropriation and may be shown in the Remarks column if desired.

(2) Previous Changes. For each cost variance category, enter in the appropriate columns the cost variances between the PE/DE and the CE that reflect the cumulative cost of such changes through the previous quarter. Corrections to Previous Changes will be shown as Current Changes. For example, if the previous Other Change of +15 Total should have been classified as Estimating, the Current Changes would show -15 for Other and +15 for Estimating with the appropriate base year dollar and escalation entries.

(a) Economic Changes. As defined in paragraph 3-2.a., these include changes in the CE resulting from actual escalation different from that previously assumed and from revisions to prior assumptions regarding future escalation. Enter such changes in the Escalation and Total columns and identify the amounts for each appropriation.

(b) Program Changes. These include all types of cost changes listed in paragraphs 3-2.b. through 3-2.h. Such program changes will provide the best estimate of costs including experienced and projected

FIGURE 3-1

FORMAT G. COST VARIANCE ANALYSIS

DEVELOPMENT ESTIMATE

Costs reflected in Column 1 of the program acquisition cost section

PREVIOUS CHANGES

Cumulative cost variances through the previous quarter

CURRENT CHANGES

Cost changes for the current quarter

TOTAL CHANGES

Sum of the previous and current changes and identical to Column 2 of Program Acquisition Cost Section

CURRENT ESTIMATE

Costs in Column 3 of the Program Acquisition Cost Section

SELECTED ACQUISITION REPORT

Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
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Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous	Change	Total
Program	Development	Acquisition	Current	Previous</		

SELECTED ACQUISITION REPORT

Item	Estimate	Current	Previous	Change	Remarks
1. Acquisition	1000	1000	1000	0	
2. Development	200	200	200	0	
3. Procurement	800	800	800	0	
4. Support	100	100	100	0	
5. Total	1100	1100	1100	0	

escalation. Enter the cost of the program change in base year constant dollars by appropriation for each variance category. Enter the escalation related to the program change, estimated from the base year, in the Escalation column and identify by appropriation. When negative program changes impact on the current provision for economic escalation, report escalation associated with these changes as Economic Change, to the extent such escalation was previously reflected in the CE.

(3) Current Changes. For each cost variance category, enter in the appropriate columns the cost variance between the PE/DE and the CE that reflects the cost of such changes for the current quarter. The guidance provided under paragraph 3-1.b.(2) for reporting economic and program changes in the Previous Changes section applies also to the reporting of economic and program changes for the Current Changes section.

(4) Total Changes. Enter in the appropriate columns the sum of the subtotals for Previous Changes and Current Changes. These should agree with the appropriation and escalation totals reported in column 2 of the Program Acquisition Cost section.

(5) Current Estimate. Enter in the appropriate columns the applicable costs reflected in column 3 of the Program Acquisition Cost section. The DE (3-1.b.(1)) plus or minus the Total Changes (3-1.b.(4)) must equal the CE. The parenthetical entries for escalation will reflect the sum, by appropriation, of such entries under the DE (paragraph 3-1.b.(1)) and those shown for Previous and Current Changes.

3-2. COST VARIANCE CATEGORIES

a. Economic Change. A change due solely to operation of the economy. This includes changes in the CE resulting from actual escalation different from that previously assumed and revision of the assumptions regarding future escalation. However, changes that are intended to reflect actual escalation in prior years must have prior approval of ASD(C).

(1) Economic changes occur only when indices are changed or when there is a negative program change (a cost reduction in any category).

(2) Maintenance of an audit trail, whether for SAR purposes or for documentation requirements for program/milestone reviews, requires a consistent and unbroken price level index series from the program base year. When actual inflation differs from the escalation previously projected, the index series must be revised. If the index values for the budget and prior years change, an adjustment to both the base year and escalation dollars will be required.

(a) If the index value for a prior year increases, the escalation associated with that year's base year dollars will increase. The increase is an Economic Change. If the increase is covered by reprogramming authority, no further variance category entries are required.

(b) If Total Obligational Authority is held constant (that is, if reprogramming is denied for the budget year), the Economic Change must be offset by one or more appropriate variance category entries. For example, if the increase is absorbed within existing funding with no change in quantities, configuration, or major schedule milestones, an Estimating Change is required. This indicates that all planned effort will be accomplished for less cost than previously estimated.

(c) There is no requirement to update routinely prior year's indices. However, when the detailed program cost estimate is formally updated, a prior year's escalation adjustment may be necessary. Additional discussion on this subject is in paragraph 3-4.b.

(3) If ASD(C) approval for the prior year escalation change is requested, 20 calendar days should be allowed for the response.

(a) If a prior year escalation change is the result of applying published OSD indices, which typically include revised values for one or two prior years, no approval authority is required.

(b) If a prior year escalation revision is the result of a new estimate prepared for a major program or milestone review, no prior approval is required if the estimate was reviewed by the Cost Analysis Improvement Group (CAIG) and the program decision was rendered with no outstanding pertinent cost issues.

(4) When negative program changes occur, the escalation associated with the change is an Economic Change to the extent the previous Economic Changes were based on the deleted effort. When circumstances dictate, a reasonable and rational approximation of the required Economic Change adjustment is acceptable.

b. Program Change Related (PCR) Escalation. PCR escalation is not a variance category. It is the escalation component of all variance categories except Economic and is entered in the Escalation column of Format G. PCR escalation is the difference between the current dollar estimate and the base year dollar estimate of the change, at the time the change is made. Once a PCR escalation entry is made, future changes resulting from revision of indices will be reflected in the Economic Change category even though such changes may impact upon a previously calculated PCR escalation. As a result, subsequent Economic Changes will include a portion that results from the prior changes in the other variance categories. However, the sum of Economic Changes, PCR escalation, and the initial DE provision for escalation will always equal the total escalation contained in the CE.

c. Quantity Change. A change in quantity of an end item of equipment. Ordinarily, categorization as a Quantity Change will be limited to those end items for which unit cost reporting is required and for which cost-quantity curves (Format I) have been prepared. All quantity changes will be based on the original PE or DE cost-quantity curves. The difference between the cost of the quantity change based on the original cost-quantity curves and the cost based on the CE cost-quantity curves will be assigned to Schedule, Engineering, Estimating, and Other categories, as appropriate. This does not include changes in support items.

(1) The Quantity Change category is limited to flyaway costs as defined in DoD Instruction 5000.33 (reference (c)). A change in the number of bases or operational sites funded from the military construction appropriation is classified as a Support Change.

(2) When both quantity and schedule change during the same reporting period, it is generally easier to calculate the quantity change on the revised schedule. If this is done, the PCR escalation amount will include the Schedule Change PCR escalation. When the Schedule Change is calculated, the associated schedule PCR escalation should be subtracted from the Quantity Change PCR escalation to avoid a double count.

(3) When the CE cost-quantity curves are changed during the same reporting period as quantity is changed, the prior report CE curves should be used in the quantity change calculations. The change to the cost-quantity curves will be made in the Schedule, Engineering, Estimating, or Other categories as appropriate.

d. Schedule Change. A change in a procurement or delivery schedule, completion date or intermediate milestone for development or production. This category includes changes in production rates. Schedule changes in support items are not included.

e. Engineering Change. An alteration in the physical or functional characteristics of a system or item delivered, to be delivered, or under development, after establishment of such characteristics. This does not include changes in support items.

f. Estimating Change. A change in program cost due to a correction of error in preparing the PE or DE, refinement of a prior CE, or a change in program or cost estimating assumptions and techniques not provided for in the Quantity, Engineering, Schedule, or Support variance categories.

(1) Contract overruns or underruns and incentives are included in Estimating.

(2) Because the SAR is not an original source document, any errors in preparation of the PE or DE as reflected in the source document must be corrected in the SAR through the CE and shown as an Estimating

Change. Changes to the SAR PE or DE may be made, with prior ASD(C) approval, only when an error has been made (e.g., typographical) in transferring the baseline estimate from the source document to the SAR (see also paragraph 2-7.f.).

g. Support Change. Any change in cost, regardless of reason, associated with any work breakdown structure element not included in flyaway cost per DoD Instruction 5000.33 (reference (c)). This will generally include all cost changes associated with training and training equipment, peculiar support equipment, data, operational or site activation, and initial spares and repair parts. Construction costs associated solely with operational or site activation will be categorized elsewhere, except that a change in construction requirements (e.g., number of bases) is a Support Change.

(1) Construction costs associated solely with operational or site activation generally include real estate, site preparation, construction, conversion, utilities, and facilities required to house, service, and launch prime mission equipment to achieve system operational status. Changes to these types of construction-funded activities should be categorized according to the variance category definitions herein except for the Quantity Change category. A change in the number of sites or bases to be converted or built will be classified as a Support Change.

(2) The reason for special treatment of operational or site activation construction costs is to keep from losing track of significant changes in those programs in which construction costs are a major component of program acquisition cost.

(3) Construction costs are always precluded from the Quantity Change category. To facilitate analyses where baseline and CE quantity normalization are required, the Remarks column of Format G should identify the amount of Support changes related to changes in the number of sites or bases. This figure should be in base year and escalated dollars and should be retained in the Previous Changes section.

h. Other Changes. A change in program cost for reasons not provided for in other cost variance categories.

(1) Items included in this category include acts of God, work stoppage, federal or state law changes, and other similar unforeseeable events. Unforeseeable events include extraordinary contractual actions under the authority of P.L. 85-804 (reference (f)), except that formalization of informal commitments should be reflected under the other categories, as appropriate. Other changes are extraordinary occurrences. They are generally characterized as being:

(a) Rare occurrences.

(b) An occurrence that would not have been predicted.

(c) An occurrence that is not related to the Government's planning, funding, execution, and overall management of the program.

(2) Only those things whose nature is not known in advance and which tend to be random are candidates for the Other category. A higher than expected labor settlement is not an unusual or extraordinary occurrence even though it may not have been predicted. Changes in budget requests whether occurring in the PPBS cycle or in Congress are not classified as Other Changes even if a prior authorization or appropriation act is changed. Such changes are common, fact-of-life occurrences.

(3) It should be clear that use of the Other category is severely restricted. The temptation to include in this category anything other than the specific items mentioned in paragraph 3-2.h.(1) should be resisted.

3-3 ORDER OF COMPUTATION

a. Cause and Effect. DoD Instruction 7000.3 (reference (a)) requires that variance calculations be made in a specific order. Before discussing the order, and reasons for it, some discussion of the relationships between variance categories and cause and effect will be useful.

(1) Because there are only seven variance categories, the choosing of a category based solely on cause may be difficult. For example, if a budget reduction results in a schedule slip, the cost increase cannot be categorized in terms of its cause, i.e., the budget cut. The only suitable category is Schedule which reflects the effect of the change but not the cause. Similarly, a design change could lead to a quantity reduction in at least two ways. First, if the cost of the design change is large enough, affordability considerations could lead to the quantity reduction. Second, the design change, regardless of cost, could result in a better system that reduces the number of systems required to meet the expected threat. In either event, it could be argued that the change in quantity should be shown in the Engineering category since the cause of the quantity reduction was the design change.

(2) The preceding discussion makes it clear that categorizing by cause can be difficult or misleading. Sometimes both the cause and the effect may result in the selection of the same variance category. When this is not the case, the analyst should give priority to categorizing by effect.

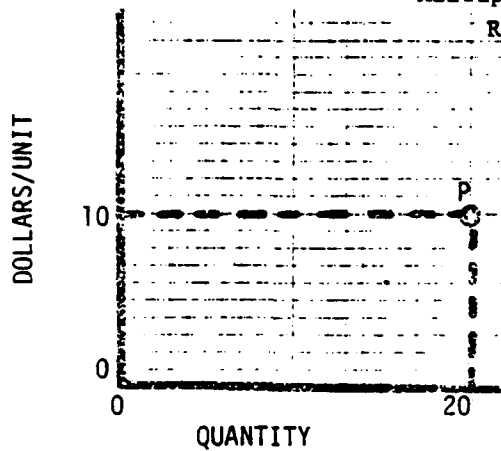
b. Effects of Computation Order. With the above caveat in mind, the first step in preparing the variance table (Format G) is to determine the cost effects of program changes during the reporting period. Once the

effects have been determined, the analyst is faced with the problem of deciding in which order to compute the variance categories. Figures 3-2 and 3-3 show the effect of differing orders of calculation for a simultaneous change in quantity and estimating relationships. Item A in figure 3-2 shows the program before change. The area under the curve defined by point P represents the total program cost of \$200. The program will be changed by increasing the unit costs from \$10 to \$15 and by decreasing the quantity to be bought from 20 to 15 units. Item B shows the program after incorporating only the Estimating Change. The area under the curve defined by point P' represents \$300. The program has grown from \$200 to \$300, an increase of \$100. The cross-hatched area under the curve shows the change graphically. Similarly, item C shows the calculation of the quantity decrease from 20 to 15 units after having incorporated the Estimating Change. The new program total defined by point P" is now \$225, or \$75 less than the result of B. Hence, the quantity variance is \$-75 as shown by the cross-hatched area. Note that the new program after both quantity and estimating changes is \$225, or \$25 more than the original \$200 program. The \$25 increase is the net result of the \$100 estimating increase and the \$75 quantity decrease. Figure 3-3, items A through C, shows the same program and related changes as in Figure 3-2, but the Quantity Change is calculated before the estimating change. Note that the total net change is the same as in Figure 3-2, but the amounts of the individual variances are different. Table 3-1 summarizes the variance category amounts arrived at by the differing orders of calculation. Similar differences in variance category amounts, depending on order of calculation, can be shown for other combinations of change categories and for other combinations of estimating and quantity increases and decreases. This simple example, however, is sufficient to show the difficulties that will be encountered in analyzing cost growth trends if variances are not computed consistently from quarter to quarter and program to program.

	ORDER OF VARIANCE CALCULATION	
	Estimating First	Quantity First
Estimating Variance	+100	+75
Quantity Variance	-75	-50
Net Program Change	+25	+25

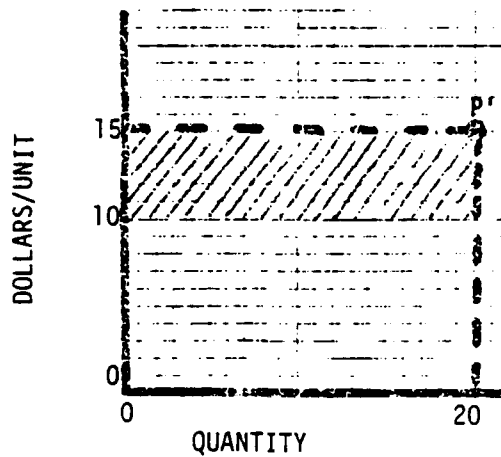
TABLE 3-1

FIGURE 3-2
Multiple Related Changes



A. Previous Program:

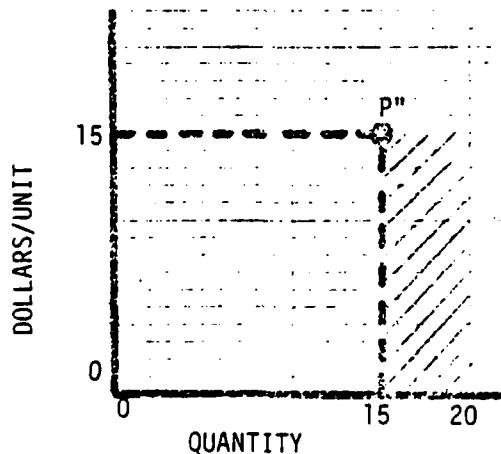
20 units at \$10 each = \$200



B. Estimating Change:

Unit cost increases from \$10 to \$15. New program cost for 20 units at \$15 per unit is \$300. Estimating change variance is:

$$\$300 - \$200 = \$+100$$

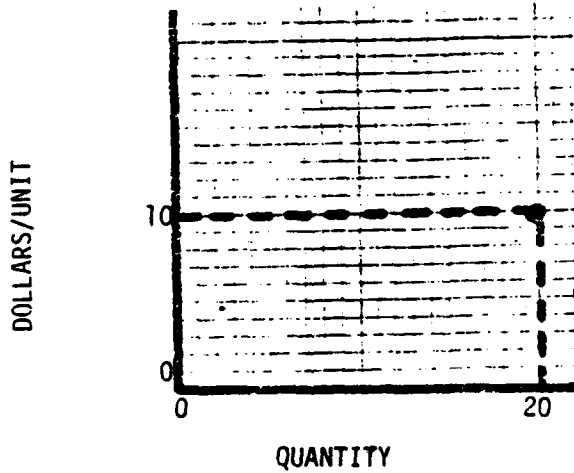


C. Quantity Change:

Quantity decreases from 20 units to 15 units. New program cost for 15 units at \$15 each is \$225. Quantity change variance is:

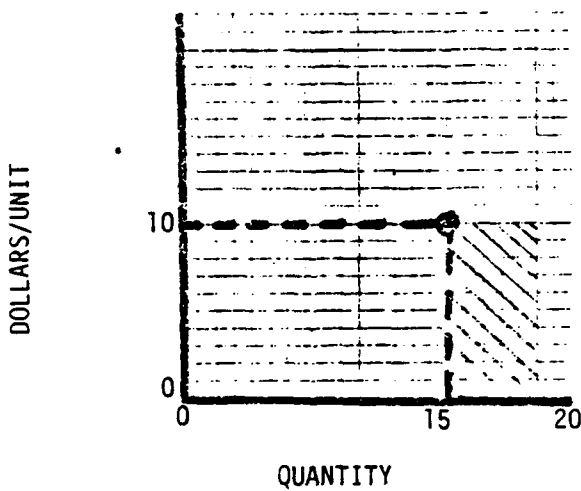
$$\$225 - \$300 = \$-75$$

FIGURE 3-3
Multiple Related Changes



A. Previous Program:

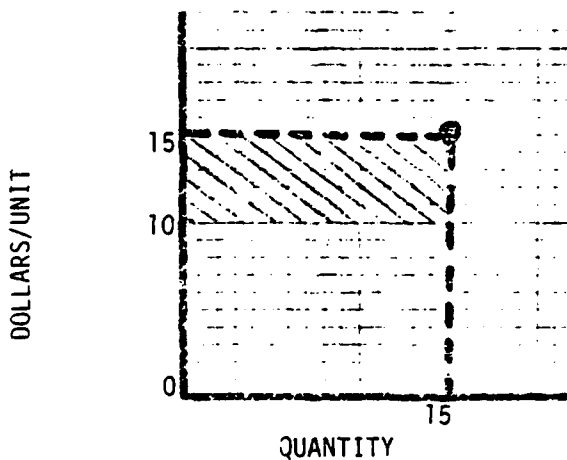
20 units at \$10 each = \$200



B. Quantity Change:

Quantity decreases from 20 units to 15 units. New program cost for 15 at \$10 each is \$150. Quantity change variance is:

$$\$150 - \$200 = \$-50$$



C. Estimating Change:

Unit cost increases from \$10 to \$15. New program cost for 15 units at \$15 each is \$225. Estimating change variance is:

$$\$225 - \$150 = \$+75$$

c. Required Order. Attempting to establish computational order on a case-by-case basis may be subjective and inconsistent. The problem must be resolved, however, since the order can yield different category values even though the sum total of all variances is unchanged. The computational order established below will ensure consistent computation of variances and will permit comparisons to be made on a comparable basis both within and between programs.

(1) Economic Changes are computed first since they are due solely to operation of the economy. This requires that Economic changes be derived from the CE immediately preceding the SAR where the change is to be reflected.

(2) Quantity Changes are calculated next because current period engineering and estimating changes may change the cost-quantity curve assumptions. As was noted in paragraph 3-2.c.(2), an adjustment to PCR escalation may be required if Quantity and Schedule are changed in the same report. If Quantity Changes are computed after the Engineering and Estimating categories, the necessary adjustments could become tedious.

(3) Calculating Schedule Changes next completes the definition of the scope of the current program. It also makes the adjustment of the Quantity PCR escalation straightforward when such adjustment is required.

(4) The next three categories in order of calculation are Engineering, Estimating, and Other. This order is established for consistency. There is no specific requirement for category integrity, as in the case of Economic and Quantity, and ease of calculations or adjustments is not generally affected by the order of the computation of these categories.

(5) The Support category is computed last because some support items are estimated on relationships to flyaway costs. For example, spares costs may be based on a percentage of flyaway cost.

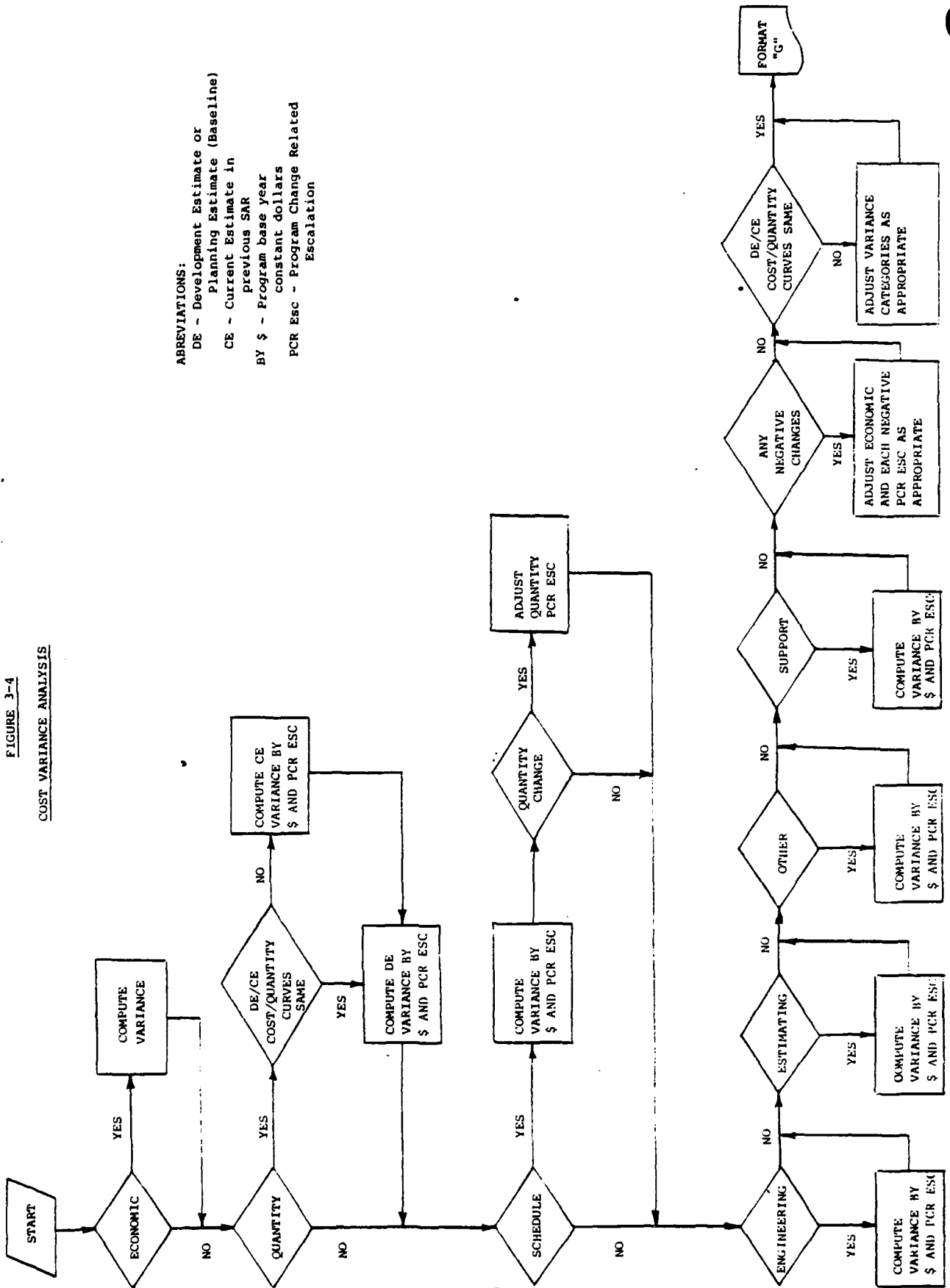
d. Exceptions. The preceding order of computation is established to insure consistency in those instances where order can affect the magnitude of the variance category. When the magnitude is independent of order, the analyst may perform the calculations in whatever order is most convenient.

e. Summary. Figure 3-4 is a schematic diagram of the variance calculation requirements described under subsections 3-2 and 3-3. A detailed example of typical variance computations is contained in Appendix A.

3-4. SPECIAL PROBLEMS

a. General. It is not unusual for special circumstances or situations to arise for which DoD Instruction 7000.3 (reference (a)) does not include specific guidance. While a complete listing of all special situations is not possible, the following list covers the most common situations experienced

FIGURE 3-4
COST VARIANCE ANALYSIS



to date. When situations arise that are not covered in reference (a) or in this guide, guidance should be sought from the OASD(C) through the appropriate DoD Component channels.

b. Revision to Prior Year's Escalation Estimate. When actual inflation differs from the amount originally projected, as described in subparagraphs 3-2.a.(2) and 3-2.a.(3), the variance categories may be distorted unless adjustments are made in the Economic Changes category. For example, if actual inflation is less than that previously estimated, the program experiences a real (constant dollar) cost growth unless the program scope is increased or cost estimates are decreased accordingly. On the other hand, if actual inflation is greater than anticipated, the program cannot be completed as planned unless additional funding is obtained. This problem is not serious when the differences between estimated and actual escalation are small. However, when the differences are large, significant distortions in variance categories can arise if estimated escalation is not adjusted to reflect actuals.

(1) For example, if the year 1974 was estimated to require \$100 in 1973 constant dollars and inflation was expected to be 5 percent, total funding would have been \$105 ($\$100 \times 1.05 = \105). If inflation actually occurred at a 10 percent rate, then only \$95.5, in 1973 dollars, was available to the program ($\$105 \div 1.1 = \95.5). Inflation accounted for \$9.5 ($\$105 - \95.5) rather than the \$5 ($\$105 - \100) originally provided for. If all planned work was completed, despite the unexpected increase in inflation, the program must have been overestimated. The Current Changes display should then show:

(a) An Economic Change of \$+5.0 derived from the difference between the \$100 constant FY 73 dollar requirement inflated by the assumed 5 percent rate and the actual 10 percent rate ($\$100 \times 1.1 - \$100 \times 1.05 = \$110 - \$105 = \$5$).

(b) An Estimating Change of \$-4.5 with a PCR escalation figure of \$-0.5. Since only \$105 is available to the program, the \$+5.0 Economic Change must be exactly offset by an Estimating Change which includes PCR escalation at the 10 percent rate. Hence, $\$5.0 \div 1.1 = \4.5 and $\$4.5 \times 0.1 = \0.5 . The sum of the resultant \$4.5 constant dollar amount (FY 73\$) and the \$0.5 PCR escalation is \$5.0 and exactly offsets the Economic Change.

(2) If some effort had to be deferred until the next year because of inflation, the calculations and net variances would be different. Table 3-2 illustrates this problem in current and constant 1973 dollars for 2 years. The table reflects the program before the change. The annual escalation rate is also shown and a single year outlay is assumed.

	<u>1974</u>	<u>1975</u>
Current \$	\$105	\$110.3 ¹
FY 73 \$	\$100	\$100
Annual Rate	5%	5%

$$^1_{100} \times 1.05 \times 1.05 = 110.3$$

TABLE 3-2

(3) Table 3-3 shows the same 2 years as they would appear a year later after the actuals for 1974 are known. Escalation in 1974 was 10 percent, rather than 5 percent, but only the original \$105 was appropriated.

	<u>1974</u>	<u>1975</u>
Current \$	\$105.0	\$120.7
FY 73 \$	\$95.5	\$104.5
Annual Rate	10%	5%

TABLE 3-3

The 1973 constant dollar amount of \$104.5, required in 1975, is the result of rescheduling the \$4.5 worth of effort not completed in 1974 (\$100 - \$95.5 = \$4.5). The \$120.7 current dollar requirement for 1975 is the result of inflation applied to the FY 73 constant dollar requirement of \$104.5 for the 1975 effort. Since inflation was 10 percent in FY 74, rather than the 5 percent originally assumed and is expected to be 5 percent in FY 75, the figure \$120.7 is the product of \$104.5 X 1.10 X 1.05. The associated Economic and Schedule Change variances are computed by summing the effects for each year as shown in Table 3-4.

	<u>1974</u>	<u>1975</u>	<u>Total Variance</u>
Economic Change	\$+5.0	\$+5.2	\$+10.2
Schedule Change	\$-4.5 (\$-0.5 PCR)	\$+4.5 (\$+0.7 PCR)	\$ + 0.2 PCR
Net Change			<u>\$+10.4</u>

TABLE 3-4

(a) The total variance (\$10.4) is the result of subtracting the original current dollar estimate for 1975 of \$110.3 (Table 3-2) from the revised figure of \$120.7 (Table 3-3).

(b) The net change for the year 1974 is 0 since the total funding has been held at \$105. The Economic Change for 1974 is computed first in accordance with the order established in paragraph 3-3.c. Computing the effects due solely to the economy (adjusting the previously assumed 5 percent rate to the 10 percent actual) results in $\$100 \times 1.10 = \110 . Since our original current dollar estimate for 1974 was \$105, the Economic change is \$+5 ($\$110 - \105). Now, since only \$105 is received, \$5 worth of effort must be rescheduled. Note that since the \$5 to be rescheduled is the difference between two current dollar figures, it must itself be in current dollars. Since the inflation rate is 10 percent, the constant dollar value of the work being rescheduled is $\$5.0 \div 1.1$ or \$4.5. The difference between the \$5.0 in current dollars and the \$4.5 constant dollar value is \$0.5 and is the PCR escalation.

(c) The Economic Change for 1975 must be computed solely on the basis of inflation. This means that the work being rescheduled from 1974 is not involved in this calculation. The current dollar figure originally estimated for 1975 was \$110.3 based on a 5 percent rate assumption for 1974 and 1975 ($\$100 \times 1.05 \times 1.05 = \110.3 from Table 3-2). Using the revised 1974 rate of 10 percent yields \$115.5 ($\$100 \times 1.1 \times 1.05$). The difference between the \$115.5 and the \$110.3 is \$+5.2 and is shown in Table 3-4 as the Economic Change for 1975. The Schedule Change for 1975 is determined by moving the \$4.5 constant dollar figure from 1974 to 1975 and escalating ($\$4.5 \times 1.10 \times 1.05 = \5.2 ; $\$5.2 - \$4.5 = \$0.7$ PCR).

(d) The sum of the Economic components is \$+10.2 ($\$5.0 + \5.2). The Schedule sum is +0.2 ($\$-4.5 \div \$0.5 + \$4.5 + \0.7). The total Economic and Schedule Change is \$10.4 ($\$10.2 + \0.2) and is in agreement with subparagraph 3-4.b.(3)(a).

(e) Notice that the Schedule Change in constant dollars is 0 but there is a \$0.2 Schedule increase due to PCR escalation caused by the net escalation impact of reducing 1974 effort by \$4.5 and moving it to 1975. Had there been fixed or semivariable charges which differed between 1974 and 1975, some constant dollar growth would have been experienced.

(f) If no prior year adjustment had been made to reflect actual escalation experienced in 1974, the total Economic variance would have been only \$5.2 (the 1975 Economic Change) rather than the \$10.2 shown in Table 3-4. Some other category, probably Estimating or Schedule, would have shown an increase of \$4.5 plus \$0.7 PCR escalation. This would have understated the true impact of inflation and substituted a real cost growth. In general, adjustment of prior year escalation, without a change in scope of work or a change in the total program estimate, will require an Economic Change and a change in the Schedule or Estimating category, or both.

c. Escalation and Fixed Price Contracts. Escalation associated with firm fixed price (FFP) contracts should not be changed after the contract has been awarded unless the escalation change is associated with a contract change. Since the contract value does not change with subsequent changes in actual or predicted escalation, there should be no change reflected in the SAR. Escalation adjustments for costs associated with fixed price escalation (FPE) contracts should be made to reflect those escalation adjustments that have been accepted by the government. Some judgment should be exercised in applying these rules. If FFP and FPE contracts are small relative to the total remaining program, separate escalation adjustments need not be made if the effort required is great and the increase in accuracy is negligible.

d. Claims. When a claim is reflected in the SAR, the figure should be treated as a constant dollar relative to the year in which the work subject to claim was done. Therefore, the constant dollar value is not necessarily associated with the year in which the claim is settled or funded. In addition, the claim amount reflected in the SAR should be assigned to variance categories in accordance with the basis of the claim and consistent with SAR variance category definitions. For example, if the basis for the claim is a design change, the variance is an Engineering Change. If the basis is schedule slip and abnormal inflation, the appropriate amounts should be assigned to the Economic and Schedule categories. If the claim is settled for an amount other than that originally submitted and a specific breakdown is not known, it should be allocated in the SAR in proportion to the original claim amount with adjustments for any costs specifically disallowed.

Chapter 4 ECONOMIC FACTORS

4-1. GENERAL

To portray the impact of price level changes over the acquisition span of a program, economic adjustments must be made. These economic adjustments involve the use of an index. This section addresses the construction of indices and the terminology and definitional differences between common usage and SAR usage.

4-2. DEFINITIONS

a. Inflation. For purposes of SAR preparation, inflation is defined as a rise in the general price level of goods and services produced in the economy. Inflation is measured by the rate of rise of some general product-price index in percent per year. It should be noted that this is not the only definition of inflation, but it is the most appropriate for SAR purposes. The definition involves rising prices for current output. Rising prices for bonds, equity claims (stocks), existing durable goods, and land may accompany inflation but they do not constitute inflation. Also, the price increases must occur across many lines of goods and services. For example, if the price of a particular machine tool is increasing but comprehensive indices, such as the implicit GNP price index, are relatively stable, the increase probably cannot be attributed to inflation. A supply and demand imbalance or declining productivity at the plant or in the industry may be responsible.

(1) The purpose of this short discussion on inflation has not been to make the reader an expert on the subject. Rather, the reader should begin to appreciate the technical complexities associated with measuring inflation.

(2) The terms inflation and escalation in this text are considered to be synonymous. However, the following distinctions may occasionally be encountered:

(a) Inflation is sometimes used in connection with historical price level changes only (that is those that have already occurred).

(b) Escalation is then defined as those price level changes that are predicted to occur.

(c) For SAR purposes these distinctions are of no importance. In fact, the distinction may be confusing in that Format G of the SAR includes a column headed Escalation that portrays the total impact of inflation, both prior and future, by variance category. The figures in the Escalation column are referred to as program change-related escalation for all variance categories other than Economic.

b. Current Dollars. Dollars that are current to the year in which the cost is incurred. When incurred costs are stated in current year dollars, the figures given are the actual amounts paid out or owed. When future costs are stated in current dollars, the figures given are the actual amounts that will be or are expected to be paid, including any amount due to future price changes. The word current in current dollars does not refer to the year in which the estimate is made or to any other single year. The terms current, then-year, and escalated dollars are synonymous.

c. Constant Dollars. Dollars that are always associated with a given base year (e.g., FY 77 constant dollars). The terms constant, constant year, and base year dollars are synonymous. An estimate is said to be in constant dollars if costs for all work contemplated in each year of a multiyear program are adjusted so that they reflect the average level of prices prevailing in the base year. An average can be calculated from monthly or quarterly data, but the precision is probably not worth the effort. Common practice is to assume the average level of prices to be the prices prevailing at the midpoint of the fiscal year.

(1) For those SAR programs that have funding prior to the base year, the Format E constant dollar entries should be the sum of prebase year actuals and the constant dollar amounts for the base year and all subsequent years. Inflating prebase year actuals to their base year values is correct for cost analysis purposes where all costs must be normalized to the same base year. For SAR purposes, however, prebase year values should not be adjusted. A footnote should be added identifying the amount to be added in order to put the entire program in base year constant dollars. For example, if the base year is FY 75 and inflation from FY 74 to FY 75 was 10 percent, the actual (current) dollars for FY 74 must be increased by 10 percent to be in constant FY 75 dollars. If the FY 74 actuals were \$10M, show \$11.0M ($\$10M \times 1.10 = \$11.0M$) even though only \$10M is spent. The extra \$1.0M is sometimes called negative inflation.

(2) The phrase "program base year constant dollars" references the purchasing power year that is held constant, or the program base year. The phrase is redundant unless the program base year is identified in context. For clarity, it is better to use terminology that is self-explanatory such as "constant FY 78 dollars."

4-3. INDICES

An index number is a number that expresses the relative relationship between two or more figures, where one of the figures is used as a base. If there is a time series of prices for a particular item, an index is established by dividing each price by the base period price. The single commodity index just described is called a simple index. If we combine the simple indices for several commodities into a single summary figure, the result is a composite index. In common practice, no distinction is made between

the terms simple index and composite index. Price level index refers to a summary measure of relative price level changes that is made up of numerous individual commodities.

a. Price Level Index. An index describing the changes in purchasing power of the dollar over time. A price level index can measure price changes for anything from paper clips to the Gross National Product and every relevant combination in between. Table 4-1 is a typical DoD index.

PRICE LEVEL INDEX			
<u>Research, Development, Test & Engineering</u>			
<u>Fiscal Year</u>	<u>1970=100</u>	<u>1974=100</u>	<u>Annual Rate(%)</u>
1967	87.73	71.69	-
1968	90.92	74.30	3.6
1969	94.76	77.44	4.2
1970	100.00	81.72	5.5
1971	105.07	85.87	5.1
1972	109.00	89.08	3.7
1973	113.17	92.49	3.8
1974	122.36	100.00	8.1
1975	135.64	110.85	10.9
1976	144.04	117.71	6.2

Source: Department of Defense Deflators (Outlays), Office of the Assistant Secretary of Defense (Comptroller), January 28, 1976.

TABLE 4-1

Several points about the data in the table are worth noting:

(1) The two indices differ only in that they measure from a different base year. The base year is that year for which the index value is 100. For example, if every number in the column with base year 1970=100 is divided by the value for 1974 (122.36) and multiplied by 100, the 1974=100 column will result. This procedure can be used to normalize an index to any desired base year.

(2) Since the two indices differ only by base year, the annual rate of inflation is the same for both. For example, the annual rate from FY 1972 to FY 1973 is shown in the table as the FY 73 rate of 3.8 percent. This can be calculated from either series by dividing the 1973 value by the 1972 value and multiplying by 100:

for 1970=100: $\frac{113.17}{109.00} \times 100 = 103.8\%$ or an increase of 3.8%

for 1974=100: $\frac{92.49}{89.08} \times 100 = 103.8$ or 3.8%

(3) The price level index in Table 4-1 is for fiscal year changes. This means price level changes are being measured from the middle of one fiscal year to the middle of the next fiscal year. The index is applied to amounts to be spent in each fiscal year. In DoD terminology such amounts are called outlays and the price level index is called an outlay deflator.

b. Outlay-Weighted Index. As stated earlier, no distinction is made between the terms simple or composite index in general practice. However, within the Department of Defense, the term composite index has been used to mean a price level index that has been combined with outlay or expenditure rates. The most appropriate term would be outlay-weighted index.

(1) An outlay-weighted index is required because SAR inflation calculations are typically performed on the TOA amounts of the RDT&E, Procurement, and Military Construction appropriations. As shown in paragraphs 4-3.c. and 4-3.d., these calculations can be performed on either the constant or current dollar values. The annual price level index (outlay deflator) cannot be applied directly to the TOA amount because TOA funds are usually expended over a period of 2 or more years. TOA is a term used by the Department of Defense; it is not a Government-wide term. It refers to the value of the direct Defense program for each fiscal year. For example, if it is proposed to procure 10 aircraft at a cost of \$1 million each, to be funded by a \$9 million appropriation and a \$1 million FMS transfer, that is \$10 million in TOA. For the remainder of this discussion, TOA is assumed to equal the appropriation. For SAR programs this assumption is usually valid. However, if this assumption is not true, as in the aircraft example above, calculations are made against TOA. Table 4-2 displays a typical TOA profile and outlay pattern.

Fiscal Year	TOA (Millions of \$)	OUTLAYS					
		Fiscal Year (11%)	FY+1 (50%)	FY+2 (18%)	FY+3 (16%)	FY+4 (5%)	Total (100%)
1970	50	5.5	25.0	9.0	8.0	2.5	50
1971	60	6.6	30.0	10.8	9.6	3.0	60
1972	70	7.7	35.0	12.6	11.2	3.5	70
1973	80	8.8	40.0	14.4	12.8	4.0	80
1974	60	6.6	30.0	10.8	9.6	3.0	60
1975	20	2.2	10.0	3.6	3.2	1.0	20

TABLE 4-2

(2) The table shows that \$50M appropriated for FY 70 is expended over a 5-year period from FY 70 through FY 74. In FY 70, \$5.5M or 11 percent of the total is expended. Four years later, in FY 74, the last \$2.5M (5 percent) is expended. Similarly, the \$20M, FY 75 appropriation, is expended over the period FY 75 through FY 79. For simplicity, the transition quarter between FY 76 and FY 77 has been ignored. See paragraph 3-4. As the table indicates, the amount appropriated in a particular year must include the expected impact of inflation on that part of the appropriation that will be expended in subsequent years. For this reason, the annual price level index cannot be applied directly to the appropriation amounts to make economic adjustments.

c. Constant Dollar Outlay Rates. There are two ways to handle the outlay problem. One is to apply the annual price level factors to the individual constant dollar outlay amounts of a given year's appropriation and sum the total. This procedure is illustrated in Table 4-3 for a FY 71 appropriation whose value, in FY 70 constant dollars, is \$80M. That is, the base year for this program is FY 70 and one year's appropriation (TOA) is being inflated.

Fiscal Year	Outlay (%)	Outlay Amount In FY70\$	Price Level Index (FY70=100)	Outlay Amount Inflated
1971	→ 11	8.8	→ 105.1	→ 9.2
1972	50	40.0	109.0	43.6
1973	18	14.4	113.2	16.3
1974	16	12.8	122.4	15.7
1975	5	4.0	135.6	5.4
Total	100%	→ \$80.0M		\$90.2M

TABLE 4-3

The calculation for the FY 71 outlay is:

$$(\text{Constant \$ appropriation}) \times \frac{(\text{outlay \%})}{100} \times \frac{(\text{index})}{100} = \text{inflated amount}$$

$$(\$80) \times \frac{(11)}{100} \times \frac{(105.1)}{100} = \$9.2$$

The other outlay years are computed in a similar fashion. Summing the individual outlay years yields an inflated total of \$90.2M for the FY 71 appropriation. The amount attributable to escalation is \$10.2M (\$90.2 - \$80.0) or 12.8 percent (\$10.2 ÷ \$80). If the FY 71 index factor had been applied to the \$80M total, the escalated total would be escalated by \$6.1M:

$$\$80 \times \frac{105.1}{100} = \$84.1$$

$$\$90.2 - \$84.1 = \$6.1$$

(1) The method just demonstrated in Table 4-3 is correct but tedious if applied to a 10 or 20 year funding profile. It is easier if the annual index is converted to incorporate the outlay rate. Table 4-4 displays such a conversion. Note that the outlay and price level columns are the same as in Table 4-3 except for the division by 100.

Fiscal Year	Outlay (% ÷ 100)	X	Price Level Index ÷ 100 (FY 70 = 100)	=	Outlay Weighted
1971	0.11		1.051		0.116
1972	0.50		1.090		0.545
1973	0.18		1.132		0.204
1974	0.16		1.224		0.196
1975	<u>0.05</u>		1.356		<u>0.068</u>
Total	1.00				1.129

TABLE 4-4

The sum of the composite column is the outlay-weighted index for FY 71. In this case the value is 1.129. The Table 4-3 result is derived by using the outlay weighted factor as follows:

$$\$80 \times 1.129 = \$90.3$$

The slight difference between 90.3 and 90.2 is caused by rounding. Table 4-5 displays a tabular format for adjusting a complete price level index series where outlay rates are assumed to apply to constant dollar outlays.

(a) The outlay-weighted index numbers at the bottom of Table 4-5 are computed by multiplying the outlay factor (second column) by the price level index for the appropriate year, and summing the resultant figures along the diagonal. A comparison of the underlined figures in the FY 71 diagonal (see Table 4-5), the underlined price level index values from FY 71 through FY 75, and the underlined outlay factors with the computations in Table 4-4 clarifies the procedure demonstrated in Table 4-5.

(b) Observe in Table 4-5 that the base year is FY 70 and its price level index value is 1.0. However, the value of the outlay-weighted index number for FY 70 is 1.074, reflecting a 7.4 percent inflation amount. The base year of the outlay-weighted index is still FY 70, but the outlay-weighted series will not have a value of 1.0 for any year, except by chance. It is possible to divide each outlay-weighted number by the outlay-weighted number for FY 70 and derive an outlay-weighted series in which FY 70 has a value of 1. Such a procedure shifts the purchasing power measurement point

from the middle of the fiscal year to the middle of the outlay period. Instead of measuring inflation based on purchasing power at the end of December 1969 (the middle of FY 70), this procedure would measure from a purchasing power base some 12 to 24 months later, given the outlay period and rates assumed in the example. An outlay-weighted index that is normalized in this manner is called a TOA deflator. TOA deflators are used in some DoD budget analyses but should never be used in SAR computations. The point to remember is that the actual dollar amount appropriated for FY 70 is not a constant FY 70 dollar unless the total amount is planned to be expended within FY 70.

(2) It is common practice to back into the escalation amount. This is especially true for those programs which use contractor estimates rather than the PM's best estimate. While backing into the escalation amount is not encouraged, it should be noted that the current dollar TOA when divided by the outlay-weighted index will result in the base year dollar value of the TOA.

(3) The use of outlay rates contains a small distortion. Expenditures do not necessarily reflect when costs are incurred but when bills are paid. Inflation impacts only up to the point where the cost is incurred. However, the relatively small error introduced using outlay rates does not justify the effort required to collect more precise information. Also, the outlay rates in this discussion are constant dollar outlay rates. If outlay rates are derived from actual (current dollar) experience, the data should be normalized to a constant dollar base before determining the outlay rates. Otherwise, distortion will be introduced if the rates are used to spread constant dollar amounts. If the analyst has only current dollar outlay rates, the outlay-weighted index should be derived by the procedure discussed in the next paragraph.

d. Current Dollar Outlay Rates. The preceding discussion has considered outlay rates as a percent of the constant dollar TOA equivalent. If outlay rates are assumed to apply to current dollar TOA, an alternative procedure is used to construct weighted indices. Assuming an FY 1971 appropriation of \$90.2M in current dollars, we can recalculate Table 4-3 as shown in Table 4-6.

Fiscal Year	Outlay (%)	Outlay Amount Current \$	Price Level Index (FY70=100)	Outlay Amount in FY70\$
1971	11	9.9	105.1	9.4
1972	50	45.1	109.0	41.4
1973	18	16.3	113.2	14.4
1974	16	14.4	122.4	11.8
1975	5	4.5	135.6	3.3
Total	100%	\$90.2M		\$80.3M

TABLE 4-6

Fiscal Year	Outlay % ÷ 100	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Price Level Index ÷ 100		0.948	1.000	1.051	1.090	1.132	1.224	1.356	1.440	1.498	1.558	1.620
Appropriation Year	0.11	0.104	0.110	0.116	0.120	0.125	0.135	0.149				
Plus 1	0.50		0.500	0.526	0.545	0.566	0.612	0.678	0.720			
Plus 2	0.18			0.189	0.196	0.204	0.220	0.244	0.259	0.270		
Plus 3	0.16				0.174	0.181	0.196	0.217	0.230	0.240	0.249	
Plus 4	0.05					0.057	0.061	0.068	0.072	0.075	0.078	0.081
Base = FY 1970 Constant Dollars												
				Outlay Weighted Index		1.024	1.074	1.129	1.195	1.286	1.390	1.469
				Fiscal Year		1969	1970	1971	1972	1973	1974	1975

TABLE 4-5

The calculation for the FY 71 outlay is:

$$(\text{Current \$ appropriation}) \times \frac{(\text{outlay \%})}{100} \div \frac{(\text{index})}{100} = \text{Amount in FY 70\$}$$

$$(\$90.2) \times \frac{(.11)}{100} \div \frac{(105.1)}{100} = \$9.4$$

Note that the fiscal year spread of outlays, in both current and constant dollars, is different from Table 4-3, resulting in an increased total outlay amount in FY 70 dollars.

(1) It may appear that this method requires advance knowledge of the current dollar TOA and cannot be applied to the constant dollar TOA equivalent. This is not the case. Review of the Total line in Table 4-4 shows that the outlay represents the escalation of a hypothetical amount of \$1.00 in constant FY 70 dollars up to \$1.129 in current dollars. The corresponding table for the current dollar application of outlay rates is as follows:

Fiscal Year	Current \$ Outlay (% ÷ 100)	÷	Price Level Index ÷ 100 (FY 70 = 100)	=	FY70\$ Outlays
1971	0.11		1.051		0.105
1972	0.50		1.090		0.459
1973	0.18		1.132		0.159
1974	0.16		1.224		0.131
1975	<u>0.05</u>		1.356		<u>0.037</u>
Total	1.00				0.891

TABLE 4-7

(a) This procedure deescalates a hypothetical \$1.00M in current dollars FY 71 TOA to \$0.891M in constant FY 70 dollars. Since inflation indices are commonly stated as a ratio of current dollars to constant dollars, the 0.891 value is the reciprocal of the desired index value. The final weighted index must be obtained as follows:

$$\frac{\text{Then-Year \$ Total}}{\text{FY70 \$ Total}} = \frac{1.00}{0.891} = 1.122$$

The Table 4-6 result derived by use of the weighted factor is:

$$\$90.2 \div 1.122 = \$80.4$$

where, again, the slight difference between \$80.3 and \$80.4 is caused by rounding.

(b) The weighted index of 1.122 was obtained independent of the TOA amount and can be used to inflate constant dollar requirements to current dollar TOA.

(2) Table 4-8 displays the tabular format for adjusting a complete price level index series, using current dollar outlay rates. Entries in the body of the table are obtained by dividing the outlay factor (second column in table) by the price level index for the appropriate year. Entries are then summed along the diagonal to obtain the reciprocal (see paragraph 4-3.d.(1)(a)) of the weighted index. The underlined values in Table 4-8 can be compared with the computations in Table 4-7 to clarify the procedure.

e. Selection of Outlay Weighting Procedure. The determination of whether to use the procedure outlined under paragraph 4-3.c. or paragraph 4-3.d. is made on the basis of outlay rate assumptions as follows:

(1) If program-peculiar outlay rates are established based on constant dollar assumptions, use the procedure under paragraph 4-3.c.

(2) If program-peculiar outlay rates are established based on current dollars, use the procedures under paragraph 4-3.d.

(3) If outlay-weighted indices are prepared using outlay rates published by OASD(C), use the procedure under paragraph 4-3.c. or d.

(4). If the activity preparing a SAR uses outlay-weighted indices provided by a higher authority, the indices can be applied directly to constant dollar TOA equivalents (by multiplication) or to current dollar TOA (by division). It is the responsibility of the activity providing the outlay-weighted index to use the proper method based on the considerations above.

f. Application of Outlay-Weighted Indices. Tables 4-9 and 4-10 show how to use an outlay-weighted index with either constant dollar TOA equivalent or current dollar TOA, respectively.

FISCAL YEAR	TOA EQUIVALENT (FY70\$)	X	OUTLAY WEIGHTED INDEX	=	TOA (CURRENT \$)	ESCALATION (CURRENT \$ - FY70\$)
1971	20		1.129		22.6	2.6
1972	40		1.195		47.8	7.8
1973	50		1.286		64.3	14.3
1974	50		1.390		69.5	19.5
1975	<u>30</u>		1.469		<u>44.1</u>	<u>14.1</u>
Total	\$190M				\$248.3M	\$58.3M

TABLE 4-9

Fiscal Year	Outlay % ÷ 100	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Price Level Index ÷ 100		0.948	1.000	<u>1.051</u>	<u>1.090</u>	<u>1.132</u>	<u>1.224</u>	<u>1.356</u>	1.440	1.498	1.558	1.620
Appropriation Year	<u>0.11</u>	0.116	0.110	<u>0.105</u>	0.101	0.097	0.090	0.081				
Plus 1	<u>0.50</u>		0.500	0.476	<u>0.459</u>	0.442	0.408	0.369	0.347			
Plus 2	<u>0.18</u>			0.171	0.165	<u>0.159</u>	0.147	0.133	0.125	0.120		
Plus 3	<u>0.16</u>				0.147	0.141	<u>0.131</u>	0.118	0.111	0.107	0.103	
Plus 4	<u>0.05</u>					0.044	0.041	<u>0.037</u>	0.035	0.033	0.032	0.031
Base = FY 1970 Constant Dollars												
				Reciprocal		0.978	0.933	0.891	0.843	0.782	0.723	0.682
				Weighted Index		1.022	1.072	<u>1.122</u>	1.186	1.279	1.383	1.466
				Fiscal Year		1969	1970	1971	1972	1973	1974	1975

$$1 / \frac{1}{0.891} = 1.122$$

TABLE 4-8

FISCAL YEAR	TOA (CURRENT \$)	OUTLAY WEIGHTED INDEX	= TOA EQUIVALENT (FY70\$)	ESCALATION (CURRENT \$ - FY70\$)
1971	22.6	1.129	20	2.6
1972	47.8	1.195	40	7.8
1973	64.3	1.286	50	14.3
1974	69.5	1.390	50	19.5
1975	<u>44.1</u>	1.469	<u>30</u>	<u>14.1</u>
Total	\$248.3M		\$190M	\$58.3M

TABLE 4-10

g. Program-Peculiar Indices. In general, program-peculiar price level indices and outlay rates are prohibited. Only those indices and outlay rates published by OASD(C) may be used. Exceptions are limited to the following:

(1) Program-peculiar price level indices for projection purposes are limited to specific contractual arrangements with the prime contractor through contract options or multiyear contracts. Such exceptions must be specifically noted in POM and budget submissions for review and approval by OASD(PA&E) and OASD(C).

(2) Use of program-peculiar outlay rates must be based on the expected contractor payment pattern. Exceptions must be approved by the Assistant Secretary (Financial Management) of the Military Department concerned with an information copy of the approval notice and supporting documentation forwarded to the ASD(C).

(3) Adjustment to the assumed escalation in TOA for years prior to the current budget year may be made to reflect actual inflation experienced. However, prior ASD(C) approval must be granted (see paragraphs 3-2.a. and 3-2.a.(3)).

4-4. 197T/1977 ANNUAL RATES

The transition quarter (FY 7T, July 1, 1976, through September 30, 1976) has caused some problems in determining equivalent annual rates for FY 7T and FY 77. Table 4-11 shows a typical procurement index and the associated periodic and annual rates:

Fiscal Year	Procurement Index	Periodic Rate (%)	Annual Rate (%)
1976	92.1	6.6	6.6
197T	96.0	4.2	6.8
1977	100.0	4.2	6.7
1978	106.2	6.2	6.2

TABLE 4-11

The periodic rates represent the rate from one fiscal year (quarter in the case of FY 7T) to the next and are determined by dividing each index value by the preceding value. For example, FY 77 = $100.0 \div 96.0 = 1.042$ or .2 percent. The index values, or their equivalent periodic rates, are used in all escalation computations including the construction of outlay-weighted indices and rates. The column display Annual Rate represents the rate of inflation as measured on an annual 12-month basis. If it were not for the transition quarter of 3 months, the annual and periodic rates would be the same. The annualized rates for FY 7T and FY 77 are for expository purposes only and are computed as follows:

The midpoint of FY 1976 is December 31, 1975; the midpoint of FY 197T is August 15, 1976; The total period midpoint to midpoint is 7.5 months or 0.625 year:

$$\frac{7.5 \text{ months}}{12 \text{ months/year}} = 0.625 \text{ year}$$

This means that the periodic rate is only 0.625 of the annual rate or, conversely, that the annual rate equals the periodic rate divided by 0.625. This can be generalized as follows:

$$\frac{\frac{Y2}{Y1} - 1}{\frac{P}{12}} \times 100 = RA$$

Y2 = subject year index value
Y1 = previous year index value
P = period in months from midpoint of subject year to midpoint of prior year
RA = annualized rate

By the above formula, the annualized rate for FY 7T is:

$$\frac{\frac{96.0}{92.1} - 1}{\frac{7.5}{12}} \times 100 = 6.8\%$$

This method is an approximation that is sufficiently accurate for SAR annual rates that are not used in calculations. When the derived rates are to be used in subsequent calculations, the following exponential formula should be used:

$$\left[\left(\frac{Y_2}{Y_1} \right)^{\frac{12}{P}} - 1 \right] \times 100 = RA$$

For the given example, this yields:

$$\left[\left(\frac{96.0}{92.1} \right)^{\frac{12}{7.5}} - 1 \right] \times 100 = 6.9$$

APPENDIX A
COST VARIANCE EXAMPLES

I. INTRODUCTION

A. BACKGROUND

1. The yardstick of a program's financial success is the magnitude of program cost growth. Cost growth is the difference between the original program cost estimate, the baseline, and the cost of the delivered system. Such a simplistic measure of cost growth yields little insight to a program's true cost experience and can be misleading. A program which has experienced no net cost growth but delivers only half the original quantity is not a financial success. On the other hand, a program completed on time, within specifications, and in full quantity but with a 50 percent cost growth because of inflation should not be considered a financial disaster.

2. Measuring cost growth in an analytically and managerially useful fashion requires the segregation of economic and quantity factors from all other cost growth. DoD Instruction 7000.3 (reference (a)) requires the segregation of cost variances into seven categories of which the Economic and Quantity categories are of paramount importance. This appendix is intended to portray typical approaches to the categorization of SAR cost variances with emphasis on multiple category changes and integrity maintenance of the Economic and Quantity categories.

B. DATA REQUIREMENTS

1. Computation of variance categories requires a baseline (usually the DE) and a CE at some level of detail by fiscal year. The minimum required detail is determined by two requirements:

a. The detailed estimate must have a line for each data element required in the Program Acquisition Cost section of Format E.

b. The detail must include a separate line for each item of hardware for which a cost quantity curve, SAR Format I, is required.

2. Because of the requirement to calculate variances in base year dollars and escalated dollars, the analyst will usually find that calculations are easier if the detailed working estimate is in base year dollars. Escalation can be identified in either a single line for each appropriation or individually for each line of the detailed estimate.

3. If the SAR analyst does not participate in the preparation of the formal detailed program estimate, he or she must make the estimator aware of the input detail required for variance calculations. This can be troublesome when the budget process results in program funding estimates which do not directly relate to the estimating assumptions and techniques of the cost analyst. When this occurs, it may be necessary to distribute the budget estimate arbitrarily to the required lines of the SAR estimate.

When making this distribution, the analyst should be careful to assign hardware line item values in a manner consistent with the appropriate cost-quantity curves. Sloppiness in maintaining the integrity of cost-quantity curve-related data elements may result in a requirement to recompute prior variances when updated cost-quantity curves are formally submitted. Updated curves are required when there is a 10 percent increase in a cost-quantity curve-related data element or when a program cost estimate is formally updated via a Program or Milestone review.

C. PROCEDURE

1. This appendix follows a hypothetical aircraft program through five SAR iterations. The computation formats and procedures portrayed are not mandatory unless specifically directed by DoD Instruction 7000.3 (reference (a)). However, the analyst's task will be easier if he or she establishes a consistent routine in terms of procedures and formats for variance calculations.

2. The following general procedures should be typical and will be followed in this appendix:

a. Prepare the CE for the previous SAR submission in the required line item detail by fiscal year. The estimate should include base year and escalated dollars by appropriation.

b. Determine, in order of calculation, the required change categories by line item.

c. Ensure that all new cost inputs are in terms of the necessary line item detail as determined in step b.

d. If inputs are in escalated dollars, convert them to base year dollars.

e. Compute the basic changes in the required order.

f. Make allocations and adjustments to basic change calculations. Allocations and adjustments will usually be required in the following circumstances:

(1) A quantity change is made when DE and CE learning curves are different.

(2) A quantity change and schedule change occur in the same report.

(3) A change results in a cost reduction.

g. Update the previous detailed CE with the current changes.

h. Prepare SAR Formats E, G, and H.

II. THE DEVELOPMENT ESTIMATE BASELINE

A. THE ESTIMATE

1. Table II.1 displays the DE by appropriation and major cost element. Major cost elements are displayed in constant FY 79 (base year) dollars with escalation shown as a single line for each appropriation. For purposes of this example, the DE is defined at the minimum level of detail consistent with the cost variance requirements of DoD Instruction 7000.3 (reference (a)). This minimum detail is driven by three requirements:

a. Each major appropriation must be separately displayed in Formats E, G, and H. In this example there are three appropriations: RDT&E, Procurement, and Military Construction.

b. Procurement costs in Format E must be displayed as flyaway cost, other weapon system cost, and initial spares and repair parts with the level of aggregation in each major increment determined on a program-by-program basis. In this example, flyaway cost is required in terms of airframe, engine, and avionics. Other weapon system cost is divided between Peculiar Support Equipment and all other.

c. Quantity changes must be computed from the original cost-quantity curves. For this example, engines and airframes are computed from cost-quantity curves. For simplicity, avionics are assumed to exhibit no learning. Although there is no SAR requirement to break out development costs, airframe and engines are detailed because prototype costs are related to the procurement cost-quantity curves. Engine spares are separately detailed because they are estimated on the same cost-quantity curve as the engines included in flyaway cost.

2. The footnotes to Table II.1 identify the cost-quantity curve assumptions and relationships between prototype and production units. SAR preparers should be familiar with learning curve theory, but this knowledge is not mandatory for preparing a SAR. The analyst can perform all necessary variance calculations provided he or she is given the new costs by fiscal year in the detail contained in Table II.1.

3. Tables II.2 and II.3 portray the economic assumptions used in the DE. The composite indices are determined by the methods explained in paragraph 4-3.c. of the guide.

TABLE II.1
DEVELOPMENT ESTIMATE BASELINE
September 30, 1978

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL
Development:											
Airframe											
Qty		1	1	2						4	
Cost		150.0	105.0	178.5						433.5	1/
Engine											
Qty	6	8	10							24	
Cost	27.4	28.8	32.6							88.8	2/
Other	272.6	221.2	512.4	621.5	750.0	300.0				2,677.7	
Total 79\$	\$300.0 3/	\$400.0 3/	\$650.0	\$800.0	\$750.0	\$300.0				\$3,200.0	3/
Index	0.917	0.972	1.030	1.092	1.158	1.227					
Escalation	3/	3/	19.5	73.6	118.5	68.1				279.7	
Total (Esc \$)	\$300.0	\$400.0	\$669.5	\$873.6	\$868.5	\$368.1				\$3,479.7	
Procurement:											
Airframe											
Qty					10	20	40	40	40	150	
Cost					720.9	1111.9	1823.8	1590.6	1460.9	6,708.1	4/
Engine											
Qty					50	100	200	250		600	
Cost					140.4	234.9	415.2	475.2		1,265.7	5/
Avionics					105.0	190.0	370.0	360.0	355.0	1,380.0	
Subtotal (Flyaway)					966.3	1536.8	2609.0	2425.8	1815.9	9,353.8	
Peculiar Support					150.0	320.0	500.0	70.0		1,040.0	
Other Weap. Sys. Cost 6/					80.0	70.0	30.0	30.0	15.0	225.0	
Initial Spares											
Engine											
Qty					25	50	60	60	45	240	
Cost					(70.2)	(117.5)	(124.6)	(114.0)	(82.3)	(508.6)	5/
Other					(75.0)	(110.0)	(140.0)	(150.0)	(149.0)	(624.0)	
Total Spares					145.2	227.5	264.6	264.0	231.3	1,132.6	
Total Proc. (79\$)					\$1341.5	\$2154.3	\$3403.6	\$2789.8	\$2062.2	\$11,751.4	
Index					1.313	1.392	1.476	1.565	1.658		
Escalation					419.9	844.5	1620.1	1576.2	1356.9	5,817.6	
Total Proc. (Esc \$)					\$1761.4	\$2998.8	\$5023.7	\$4366.0	\$3419.1	\$17,569.0	
Construction (79\$)					100.0	150.0				250.0	
Index					1.313	1.392					
Escalation					31.3	58.8				90.1	
Total Const. (Esc \$)					\$131.3	\$208.8				\$340.1	

1/-Airframe cost calculated from the following log-linear cumulative average cost-quantity curve:

$$Y = AX^b \text{ where}$$

Y = cumulative average unit cost
A = cost of the first unit
X = cumulative quantity
b = slope exponent

For the Airframe, A = \$150.0 and the exponent for the assumed 85% slope (b) is -0.234465. For this exercise, the first unit cost of \$150.0 is assumed to be constant FY78 dollars as well as constant FY79 dollars.

2/ Engine cost is calculated the same as in 1/ above except A = \$6.0 and b = -0.152003 for a 90% slope.

3/ Since the base year is FY79, the FY77 and 78 values are actuals. The amount of escalation which must be added to arrive at the FY79\$ value for those years is calculated as follows: (Pre-base year actuals) + (index) = (base year dollars); (300 + 0.917) + (400 + 0.972) = \$738.7; amount to be added is (738.7) - (300 + 400) = \$38.7 and should be shown on SAR format E by footnote.

4/ Airframe costs are based on the same cost quantity curve as for R&D prototypes except that the calculation assumes three rather than four prototype units to account for the effects of the production break between R&D and procurement.

5/ Engine costs are based on the same cost quantity curve as for R&D prototypes except that the calculation assumes 18 rather than 24 prototype units to account for the effects of the production break between R&D and procurement. Costs are computed on the basis of total annual buys, including spares, and allocated to Flyaway and Spares lines proportionally (e.g., FY82 engine buy is 50 flyaway plus 25 spares for a total engine buy of 75. The cost of 75 engines is 210.6 (FY79\$) and as allocated to flyaway by (50 ÷ 75) X 210.6 = 140.4. The balance of 70.2 (210.6 - 140.4) is for the 25 engine spares).

6/ Training and data per DoDI 5000.33 and MIL STD 881.

Fiscal Year	Annual Rate(%)	Price Level Index	Composite Indices		
			RDT&E	Procurement	Construction
1977	6	0.890	0.917	-	-
1978	6	0.943	0.972	-	-
1979	6	1.000	1.030	-	-
1980	6	1.060	1.092	-	-
1981	6	1.124	1.158	-	-
1982	6	1.191	1.227	1.313	1.313
1983	6	1.262	-	1.392	1.392
1984	6	1.338	-	1.476	-
1985	6	1.419	-	1.565	-
1986	6	1.504	-	1.658	-
1987	6	1.594	-	-	-
1988	6	1.689	-	-	-
1989	6	1.791	-	-	-
1990	6	1.898	-	-	-

Table II.2 Indices

Appropriation	Outlay Percent/Year				
	1st	2nd	3rd	4th	5th
RDT&E	55	40	5	-	-
Procurement	10	40	30	15	5
Construction	10	40	30	15	5

Table II.3 Outlay Rates

Table II.4. shows how the FY 84 composite procurement index was calculated. The tabular format is identical to Table 4-5 in Chapter 4 of the guide.

Outlay	Fiscal Year	1984	1985	1986	1987	1988
% ÷ 100	Price Level Index	1.338	1.419	1.504	1.594	1.689
.10		0.134				
.40			0.568			
.30				0.451		
.15					0.239	
.05						0.084
Composite Index = sum of diagonal =						<u>1.476</u>

Table II.4 FY84 Composite Index

B. FORMATS

1. Tables II.5, II.6, and II.7 portray SAR Formats E, G, and H for the example. These formats should be compared to Table II.1 so that the reader understands the relationship between the SAR formats and the DE detail. Since this is the first SAR, the DE and CE are the same. Note that the base year is FY 79. This means that FY 77 and 78 values are represented in Table II.1 as prebase year actuals. The values for these 2 years are never affected by the escalation calculations in this example.

2. The remainder of this example complies with the following format:

a. The changes to be made will be described.

b. Calculations will be made by variance category for each appropriate line item of Table II.1.

c. The line item changes will be summarized into the Table II.1 format to become the detailed CE on which the next set of changes will be based.

d. The CE values for SAR Formats E and H will be extracted from the new summary CE detail.

TABLE II.5

Selected Acquisition Report
System: B-X

As of Date: 30 September 1978

(Dollars in Millions)

E. Program Acquisition 1. Cost	(1) Development Estimate (FY77-86)	(2) Changes	(3) Current Estimate (FY77-86)	(4) Current & Budget Prior Yrs (FY79)	(6) Balance to Complete FYDP Beyond FYDP		(8) Total
					Funding		
Development	\$3,200.0 1/	-	\$3,200.0	\$700.0	Development	\$2,110.2	-
Procurement	11,751.4	-	11,751.4	-	Procurement	4,760.2	17,569.0
Airframe	6,708.1	-	6,708.1	-	Construction	340.1	340.1
Engines	1,265.7	-	1,265.7	-	Total	\$7,210.5	\$21,388.8
Avionics	1,380.0	-	1,380.0	-			
Total Flyaway	9,353.8	-	9,353.8	-	Quantity		
Peculiar Support Equip.	1,040.0	-	1,040.0	1	Development	2	-
Other Weap. Sys. Cost	225.0	-	225.0	-	Procurement	30	120
Initial Spares	1,132.6	-	1,132.6	1	Total	32	120
Construction	250.0	-	250.0	-			
Total: Constant FY79\$	\$15,201.4 1/	-	\$15,201.4	-			
Escalation	6,187.4	-	6,187.4	-			
Total Program Cost	\$21,388.8	-	\$21,388.8	-			
2. Quantities							
Development	4		4				
Procurement	150		150				
Total	154		154				
3. Unit Cost							
Procurement:							
Constant FY79\$	\$78.3		\$78.3				
Escalated	117.1		117.1				
Program:							
Constant FY79\$	\$98.7		\$98.7				
Escalated	138.9		138.9				
4. Approved Design to Cost Goal:							
Average Flyaway Cost for 150 units at a peak production rate of 4 per month.							
Development							
Estimate	\$62.4		\$62.4				
Escalated	93.8		93.8				
5. Foreign Military Sales:							
None							

1/ Includes \$300.0 in FY77 and \$400.0 in FY78 actuals. \$38.7 must be added to raise total pre-base year actuals to FY79\$.

TABLE II.6
COST VARIANCE ANALYSIS
(Dollars in Millions)

As of Date: 30 September 1978
Base Year: 1979

G.	Base Year/FY79 Constant \$				TOTAL	REMARKS
	DEV	PROC	CONST	SUBTOTAL		
Development Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	\$21,388.8	Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1
Previous Changes	-	-	-	-	-	
Current Changes	-	-	-	-	-	
Total Changes	-	-	-	-	-	
Current Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	\$21,388.8	Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1

TABLE II.7

Selected Acquisition Report

System: B-X

As of Date: 30 September 1978

H. BUDGET YEAR AND OUT YEAR PROGRAMS

Fiscal Year	Current Estimate		Escalation (Base Year FY79)				Rate 1/	
	Budget Year Thru Completion		Amount		Dev	Const.	Proc	Const
	Dev.	Proc.	Dev.	Proc.				
1979	\$669.5	-	\$19.5	-	6.0	-	-	-
1980	873.6	-	73.6	-	6.0	-	-	-
1981	868.5	-	118.5	-	6.0	-	-	-
1982	368.1	1,761.4	68.1	419.9	6.0	31.3	6.0	6.0
1983	-	2,998.8	-	844.5	-	58.8	6.0	6.0
1984	-	5,023.7	-	1,620.1	-	-	6.0	-
1985	-	4,366.0	-	1,576.2	-	-	6.0	-
1986	-	3,419.1	-	1,356.9	-	-	6.0	-
Total	\$2,779.7	\$17,569.0	\$279.7	\$5,817.6		\$90.1		

1/ Since the annual rates shown do not incorporate spend-out rates or the compounding effect of prior years' escalation, they cannot be used to track the inflation amounts shown for applicable years.

III. CURRENT ESTIMATE CHANGES, DECEMBER 31, 1978

A. SITUATION

1. Three changes to the CE have been directed as a result of the FY 80 PPBS process:

a. Escalation rates for the FY 80 budget and subsequent years have been revised. The new annual rates and resultant composite indices are shown in Table III.1 below.

Fiscal Year	Annual Rate(%)	Price Level Index	Composite Indices ¹		
			RDT&E	Procurement	Construction
1977	6	0.890	0.917	-	-
1978	6	0.943	0.972	-	-
1979	6	1.000	1.030	-	-
1980	6	1.060	1.095	-	-
1981	6.5	1.129	1.166	-	-
1982	6.6	1.203	1.243	1.337	1.337
1983	6.5	1.282	1.323	1.421	1.421
1984	6.4	1.364	-	1.508	1.508
1985	6.3	1.450	-	1.599	-
1986	6	1.537	-	1.695	-
1987	6	1.629	-	1.796	-
1988	6	1.726	-	1.904	-
1989	6	1.830	-	-	-
1990	6	1.940	-	-	-
1991	6	2.056	-	-	-
1992	6	2.180	-	-	-

¹Outlay rates are unchanged from Table II.3.

TABLE III.1 Indices

b. Budget limitations have resulted in a reduction of planned FY 80 funding and a restructuring of the remaining development schedule. The revised development funding is shown in Table III.2. Note that the restructuring has added 1 year to the development program and deferred one prototype airframe from FY 80 to FY 81. As a result, the start of the procurement and construction program has also been delayed 1 year.

	<u>FY80</u>	<u>FY81</u>	<u>FY82</u>	<u>FY83</u>
Prototype Qty (Airframe)	1	1	-	-
Airframe 79\$	(92.8)	(85.7)	-	-
79\$ Total	725.0	775.0	325.0	30.0
Index	1.095	1.166	1.243	1.323
Escalated \$ Total	793.9	903.7	404.0	39.7

TABLE III.2 Development Funding

c. The engine spares requirement has been increased from 240 to 270 engines. This will be accomplished by increasing the engine spares buy from 60 to 70 in the 4th year and from 45 to 65 in the 5th year.

2. Note that the funding change in Table III.2 is shown in both base year and escalated dollars. When program changes are provided to the SAR analyst in escalated dollars, the analyst should restate the values in base year dollars before proceeding with the required calculations. The 79\$ values in Table III.2 are derived by dividing the escalated dollar values by the appropriate composite index in Table III.1. This table is used rather than Table II.2 because the values are for the FY 80 budget submission and reflect the new budget indices. Although it is possible to do the required variance computations in escalated dollars and backout the escalation later, it will generally be easier to restate the initial input data in base year dollars. This will be especially true for the December SAR since the December CE will usually assume different indices than the September CE. All calculations in this appendix are done in base year dollars.

B. VARIANCE CATEGORIES AND COMPUTATIONS

1. The next step is to determine which variance categories will be involved.

a. The change in indices is clearly an Economic Change.

b. The restructuring of the development program results in a Schedule Change for all three appropriations: RDT&E, Procurement, and Construction.

c. The additional cost associated with the engine spares increase is a Support Change because spares are not part of the flyaway cost. However, since spares and flyaway engines are procured from the same production line, they are estimated on the same cost-quantity curve. The spares increase occurs in the 4th and 5th years of the procurement schedule. The last engine buy for production aircraft is in the 4th year of the procurement program. The increased spares buy in the 4th year will increase the total 4th year engine buy, spares plus flyaway, resulting in a lower average unit cost for all engines in the 4th year. The reduced cost of the 4th year production engine buy is an Estimating Change.

d. Four variance categories are involved. In accordance with DoD Instruction 7000.3 (reference (a)), the variance categories will be computed in the following order: Economic, Schedule, Estimating, and Support.

2. Table III.3 displays the required variance calculations.

a. First, the Economic Change is calculated by appropriation. The Economic Change is the difference between the immediately preceding SAR CE (September 1978) and the same estimate using the new indices. For 1980 RDT&E, the new escalation amount is the September 1980 value in base year dollars (\$800.0 from Table II.1) times the new composite index (1.095 from

Table III.1) less the base year value (\$800.0). Subtracting the September SAR escalation amount for 1980 (\$73.6 from Table II.1) from the new 1980 escalation amount yields the Economic Change for 1980. The arithmetic looks like this:

$$\begin{aligned} \$800 \times 1.095 &= \$876.0 \\ \$876.0 - \$800.0 &= \$76.0 \text{ New Escalation} \\ \$76.0 - \$73.6 &= \$+2.4 \text{ Economic Change} \end{aligned}$$

Repeating the above procedure for each year and each appropriation yields a total Economic Change of \$+394.8.

b. Next, the Schedule Change is calculated by appropriation.

(1) The new development funding from Table III.2 is spread (including the FY 77-79 values from Table II.1) and escalated by the new indices. The Total column shows a value of \$3205.0 (FY 79\$) which is \$5.0 greater than the September FY 79\$ RDT&E total of \$3200.0. The \$+5.0 is the base year dollar portion of the RDT&E Schedule Change. In Table III.3 the total RDT&E escalation is \$305.8. Subtracting the total September RDT&E escalation of \$279.7 (from Table II.1) the total escalation has increased by \$26.1. This total change includes the \$+13.2 RDT&E Economic Change calculated in B.2.a. Subtracting the Economic Change portion leaves a net program change-related escalation value of \$+12.9 for the RDT&E Schedule Change.

(2) Unlike the development program which was stretched from a 6- to a 7-year program, the procurement program remains a 5-year program with no change in the annual base year dollar amounts. The start has been delayed from FY 82 to FY 83, causing an increase in the escalated dollar totals. The procurement schedule PCR is computed exactly as it was for RDT&E in B.2.b.(1). The new total procurement escalation is \$7,278.4. Subtracting the September procurement escalation (from Table II.1) yields a total Escalation Change of \$+1,460.8. Subtracting the previously calculated procurement Economic Change of \$374.8 yields PCR escalation of \$+1,086.0. The procedure is repeated for construction.

c. The Estimating Change relating to the flyaway engines but caused by the increased engine spares buy is calculated next. This is done by subtracting the prior (September 1979 values in 79\$ from Table II.1) flyaway engine funding profile, entered on the new schedule, from the new engine flyaway funding. The result is the base year dollar change of \$-0.6. The changes by fiscal year are then escalated by the new composite indices to determine the Estimating PCR escalation.

(1) Note that in this case only FY 86 has changed. This is because the cost and quantities of both flyaway and spares engines are the same prior to FY 86.

TABLE III.3
PROGRAM CHANGES (DECEMBER 31, 1978)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	TOTAL	CHANGES
SEP. RDT&E (79\$)	\$300.0	\$400.0	\$650.0	\$800.0	\$750.0	\$300.0						\$3,200.0	
New Index	see footnote 1/		1.030	1.095	1.166	1.243						-	
New Esc			19.5	76.0	124.5	72.9						292.9	
Previous Esc			19.5	73.6	118.5	68.1						279.7	
Econ. Chg			-0-	+2.4	+6.0	+4.8						+13.2	+13.2 Economic (RDT&E)
SEP. PROCUREMENT (79\$)												\$11,751.4	
New Index												-	
New Esc												6,192.4	
Previous Esc												5,817.6	
Econ. Chg												+374.8	+374.8 Economic (Proc)
SEP. CONSTRUCTION (79\$)												\$250.0	
New Index												-	
New Esc												96.9	
Previous Esc												90.1	
Econ. Chg												+6.8	+6.8 Economic (Const)
TOTAL ECONOMIC CHANGE												\$+394.8	+394.8 Economic (Total)
REVISED SCHEDULE:													
RDT&E (79\$)	\$300.0	\$400.0	\$650.0	\$725.0	\$775.0	\$325.0	\$30.0					\$3,205.0	+5.0 Schedule (\$3205.0
New Index	see footnote 1/		1.030	1.095	1.166	1.243	1.323					-	- \$3200.0) (FY79\$)
Esc \$ Total	\$300.0	\$400.0	\$669.5	\$793.9	\$903.7	\$404.0	\$39.7					\$3,510.8	
												305.8	
												-279.7	
												+26.1	
												-13.2	
												+12.9	+12.9 PCR Escalation
Procurement (79\$)													
New Index												\$11,751.4	
Esc \$ Total												-	
												\$19,029.8	
												7,278.4	
												-5,817.6	
												+1,460.8	
												-374.8	
												\$+1,086.0	+1086.0 PCR Escalation
Const. (79\$)												\$250.0	
New Index												-	
Esc \$ Total												\$368.3	
												118.3	
												90.1	
												+28.2	
												-6.8	
												\$+21.4	+21.4 PCR Escalation

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TABLE III.3 (Continued)
PROGRAM CHANGES (DECEMBER 31, 1978)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	TOTAL	CHANGES
Estimating Change: 2/ Engine (Flyaway)													
Qty												600	
New 79\$							50	100	200	250		1,265.1	
Prior 79\$ 1/							140.4	234.9	415.2	474.6		1,265.7	
79\$ Change							140.4	234.9	415.2	475.2		-0.6	-0.6 Estimating Change (79\$)
New Index							-0-	-0-	-0-	-0.6		-	
Esc \$ Change										1.695		-1.0	-0.4 PCR Escalation
Escalation										-1.0		-0.4	(-1.0 - (-0.6))
Support Change:													
Engine Spares													
New Qty							25	50	60	70	65	240	
New 79\$							70.2	117.5	124.6	132.9	118.5	563.7	
Prior Qty							25	50	60	60	45	270	
Prior 79\$ 3/							70.2	117.5	124.6	114.0	82.3	508.6	
79\$ Change							-0-	-0-	-0-	+18.9	+36.2	+55.1	+55.1 Support Change (FY79\$)
New Index										1.695	1.796	-	
Esc \$ Change										+32.0	+65.0	+97.0	
Escalation										\$+13.1	\$28.8	\$+41.9	+41.9 PCR Escalation

- 1/ Recall from the baseline (DE) that these are pre-base year actuals.
2/ This change is due to the fact that all engines (spares and flyaway) are estimated from the same learning curve. In other words, the cost of a particular buy is independent of whether the engines are for spares or for airframe integration (see note 5/; Development Estimate Baseline Table II.1.1.)
3/ Note that these costs are entered on the new schedule.

(2) Note that these prior annual funding figures are unchanged but they are entered in terms of the new schedule (FY 83-86 rather than the September 1979 schedule of FY 82-85). This is because the engine portion of the Schedule Change is already included in the previously calculated total procurement Schedule Change.

(3) The new engine estimate in this example is derived from the cost-quantity curve described in the footnotes to Table II.1. However, it is not necessary for the SAR analyst to actually perform the cost-quantity curve calculation. All that is necessary is that the analyst be provided with the engine funding profile. Just remember that if the profile is provided in escalated dollars, the profile should be deescalated to base year dollars.

d. The Support Change is determined by subtracting the September 1979 engine spares estimate from the new engine spares estimate. These annual differences in base year dollars are then escalated by the new indices. The resulting escalation amount is the Support PCR escalation. The Table III.3 entries for Prior 79\$ are extracted from the Engine Spares line of Table II.1 and represent the September 1979 values.

3. Table II.1 should now be updated with the changes from Tables III.2 and III.3. The result is Table III.4 which represents the detailed CE for the December 1979 SAR. This table becomes the basis from which future SAR variances will be calculated.

4. Tables III.5, III.6, and III.7 are the SAR Formats E, G, and H, respectively. The values in these tables are extracted directly from Tables III.3 and III.4.

5. The calculations for the CE of the Approved Design-to-Cost Goal in Format E, Table III.5 are derived as follows:

a. The FY 79\$ value of \$62.4 can be obtained from Table III.4 by dividing the FY 79\$ flyaway subtotal of \$9,353.2 by 150 aircraft.

b. The escalated Design-to-Cost value of 101.6 is obtained by escalating the flyaway subtotal annual amounts by the Table III.1 composite indices and summing for a total flyaway cost in escalated dollars. This total is then divided by 150 aircraft.

c. Note that if quantities or production rates had been changed, this procedure could not have been used. Subsequent iterations of this example will display the detailed procedures for computing the DTC goal only to make Format E complete. It is not the intent of these examples to show how to update the DTC CE. Design-to-cost tracking should be an ongoing formal practice of the program office, and the values should be provided to the SAR analyst for direct insertion in Format E.

TABLE III.4
CURRENT ESTIMATE (DECEMBER 31, 1978)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	TOTAL
Development:												
Airframe												
Qty		1	1	1	1							4
Cost		150.0	105.0	92.8	85.7							433.5
Engine												
Qty	6	8	10									24
Cost	27.4	28.8	32.6									88.8
Other	272.6	221.2	512.4	632.2	689.3	325.0	30.0					2,682.7
Total 79\$	300.0	400.0	650.0	725.0	775.0	325.0	30.0					3,205.0
Index	-	-	1.030	1.095	1.166	1.243	1.323					-
Escalation	-	-	19.5	68.9	128.7	79.0	9.7					305.8
Total (Esc \$)	\$300.0	\$400.0	\$669.5	\$793.9	\$903.7	\$404.0	\$39.7					\$3,510.8
Procurement:												
Airframe												
Qty							10	20	40	40	40	150
Cost							720.9	1111.9	1823.8	1590.6	1460.9	6,708.1
Engine												
Qty							50	100	200	250	-	600
Cost							140.4	234.9	415.2	474.6	-	1,265.1
Avionics							105.0	190.0	370.0	360.0	355.0	1,380.0
Subtotal (Flyaway)							966.3	1536.8	2609.0	2425.2	1815.9	9,353.2
Peculiar Support							150.0	320.0	500.0	70.0	-	1,040.0
Other Weap. Sys. Cost							80.0	70.0	30.0	30.0	15.0	225.0
Initial Spares												
Engine Cost							(70.2)	(117.5)	(124.6)	(132.9)	(118.5)	(563.7)
Qty							25	50	60	70	65	270
Other							(75.0)	(110.0)	(140.0)	(150.0)	(149.0)	(624.0)
Total Spares							145.2	227.5	264.6	282.9	267.5	1,187.7
Total Proc. (79\$)							\$1341.5	\$2154.3	\$3403.6	\$2808.1	\$2098.4	\$11,805.9
Index							1.421	1.508	1.599	1.695	1.796	-
Escalation							564.8	1094.4	2038.8	1951.6	1670.3	7,319.9
Total Proc. (Esc \$)							\$1906.3	\$3248.7	\$5442.4	\$4759.7	\$3768.7	\$19,125.8
Construction (79\$)							100.0	150.0				250.0
Index							1.421	1.508				-
Escalation							42.1	76.2				118.3
Total Const. (Esc \$)							\$142.1	\$226.2				\$368.3

1/ See Format E, footnote 1.

(Dollars in Millions)

1/ Includes \$300.0 in FY77 and \$400.0 in FY78 actuals.

TABLE III.6
COST VARIANCE ANALYSIS
(Dollars in Millions)

As of Date: 31 December 1978
Base Year: 1979

G.	Base Year/FY79 Constant \$				TOTAL	REMARKS
	DEV	PROC	CONST	SUBTOTAL		
Development Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	\$6,187.4	\$21,388.8
Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1						
Previous Changes	-	-	-	-	-	-
Current Changes						
Economic	-	-	-	-	+394.8	Esc: Dev. +13.2; Proc. +374.8; Const. +6.8
Schedule	+5.0	-	-	+5.0	+1,120.3	Esc: Dev. +12.9; Proc. +1086.0; Const. +21.4
Estimating	-	-0.6	-	-0.6	-1.0	Esc: Proc. -0.4
Support	-	+55.1	-	+55.1	+41.9	Esc: Proc. +41.9
Subtotal	+5.0	+54.5	-	+59.5	+1,556.6	Esc: Dev. +26.1; Proc. +1502.3; Const. +28.2
					(CH-1)	
Total Changes	+5.0	+54.5	-	+59.5	+1,556.6	Esc: Dev. +26.1; Proc. +1502.3; Const. +28.2
Current Estimate	\$3,205.0	\$11,805.9	\$250.0	\$15,260.9	\$7,744.0	\$23,004.9
Esc: Dev. 305.8; Proc. 7319.9; Const. 118.3						

Changes Since Previous Report:

(Ch 1) The Current Estimate for total Program Acquisition Cost changes as follows:

	Current \$	FY 79\$
Development		
Reduction of \$75.0 in FY80 necessitating delay of prototype #4 from FY80 to FY81 and restructure of remaining R&D effort (Schedule)	\$ +17.9	\$ +5.0
Revision of escalation indices (Economic)	+13.2	0
TOTAL Development Cost Change	\$ +31.1	\$ +5.0
PROCUREMENT		
Revision of escalation indices (Economic)	\$ +174.8	\$ 0
One year delay in production as a result of Development change above (Schedule)	+1086.0	0
Reduction in "flyaway" engine cost as a result of economics associated with increased engine spares quantity (Estimating)	-1.0	-0.6
Increased engine spares quantity (Support)	+97.0	+55.1
TOTAL Procurement Cost Change	\$ +1556.8	\$ +54.5
CONSTRUCTION		
Revision of escalation indices (Economic)	\$ +6.8	\$ 0
One year delay due to Development change above (Schedule)	+21.4	0
TOTAL Construction Cost Change	\$ +28.2	\$ 0
TOTAL PROGRAM COST CHANGE	\$ +1616.1	\$ +59.5

TABLE III.7
Selected Acquisition Report
System: B-X

As of Date: 31 December 1978

H. BUDGET YEAR AND OUT YEAR PROGRAMS

Fiscal Year	Current Estimate			Escalation (Base Year FY79)					
	Budget Year Thru Completion			Amount		Dev		Rate 1/	
	Dev.	Proc.	Const.	Dev.	Proc.	Const.	Dev	Proc	Const
1980	793.9	-	-	68.9	-	-	6.0	-	-
1981	903.7	-	-	128.7	-	-	6.5	-	-
1982	404.0	-	-	79.0	-	-	6.6	-	-
1983	39.7	1,906.3	142.1	9.7	564.8	42.1	6.5	6.5	6.5
1984	-	3,248.7	226.2	-	1,094.4	76.2	-	6.4	6.4
1985	-	5,442.4	-	-	2,038.8	-	-	6.3	-
1986	-	4,759.7	-	-	1,951.6	-	-	6.0	-
1987	-	3,768.7	-	-	1,670.3	-	-	6.0	-
	\$2,141.3	\$19,125.8	\$368.3	\$286.3	\$7,319.9	\$118.3			

1/ Since the annual rates shown do not incorporate spend-out rates or the compounding effect of prior years' escalation, they cannot be used to track the inflation amounts shown for applicable years.

IV. CURRENT ESTIMATE CHANGES, JUNE 30, 1979

A. SITUATION

1. Three changes are required based on direction and program experience since the December SAR:

a. As the result of an April 1979 special DSARC review, the Secretary of Defense signed a Decision Memorandum directing an increase in procurement quantity from 150 to 170 aircraft. The memorandum also directed a stretchout of the procurement schedule to reflect a peak annual buy of 35 aircraft rather than the previous peak rate of 40 per year.

b. A major design change in the hydraulic systems of the aircraft has been approved beginning with the second prototype aircraft. The change will increase airframe costs by 4 percent in FY 79\$.

c. Experience on the first prototype aircraft indicates that airframe costs will be 6 percent higher in FY 79\$ than previously estimated.

2. Reprogramming actions for FY 78 and 79 and a supplemental request for FY 80 have been denied, so increased costs for these 3 years must be absorbed within current funding levels.

B. VARIANCE CATEGORIES AND COMPUTATIONS

1. Examination of the needed changes indicates five variance categories will be involved.

a. The increase of 20 aircraft is a Quantity Change.

b. The increased aircraft quantity causes an increase in spares requirements. For this example, only the engine spares requirement will change. The change will require 9 additional spares engines to be bought in FY 87. This will be a Support Change.

c. Reduction of the peak annual buy requirement from 40 to 35 aircraft will cause a schedule stretch in the procurement program. In this example only, the airframe buys will be stretched. Engines and avionics will be procured on the schedule shown for the December 1978 SAR. This change is a Schedule Change.

d. The design change to the hydraulic systems is an Engineering Change.

e. The prototype actual cost experience results is an Estimating Change.

2. The required order of calculation is Quantity, Schedule, Engineering, Estimating, and Support.

a. The Quantity Change must be calculated before the Engineering and Estimating Changes. This calculation will be based on the DE cost-quantity curve. Since no previous changes have affected the cost-quantity curves, the DE curve used in the Quantity variance calculation is also the CE curve. Since there is no difference between the DE and CE quantity calculations, no allocation to other variance categories is required.

b. Since quantity and schedule are changing in the same report, there will be a need to adjust the initial Quantity Change values by the amount of the Schedule Change. The reason for this adjustment will be clarified later in the discussion of variance calculations.

3. Table IV.1 displays the required variance calculations.

a. The new airframe profile is based on the previous (December 1978) CE cost-quantity curve. The Engineering and Estimating Changes to be calculated later will change the CE curve only for future SAR Quantity Changes. Since the December SAR CE curve is identical to the DE (baseline) curve, the Quantity Change calculation is straightforward.

(1) The FY 79\$ airframe profile for the prior program (December 1978 SAR, Table III.4) is subtracted from the new airframe profile to obtain the FY 79\$ value of the Quantity Change. Note that the two profiles are on different schedules.

(2) The annual FY 79\$ changes are escalated by the December 1979 indices. The FY 79\$ values are subtracted from this total to determine the escalation associated with the change. For example, the FY 85 change of \$-211.7 is multiplied by the FY 85 index of 1.599 to arrive at an escalated change value for FY 85 of \$-338.5. Subtracting the \$-211.7 yields an escalation amount of \$-126.8 for the FY 85 change. Summing the annual escalation changes yields a total of \$+745.9.

(3) Since the change calculations have been based on two different procurement schedules, the total escalation change of \$+745.9 includes the effects of the schedule stretch. The schedule portion will be determined later and should be subtracted from this total to arrive at the net Quantity PCR escalation.

b. The 20 new aircraft require 80 additional engines (4 each). In this example they are added to the end of the previous engine buy. No Schedule Change is involved because the previous quantity of 600 engines will still be procured as scheduled in the December 1978 SAR estimate. The calculations are identical to those for the airframe change above, except that no Schedule Change adjustment is required. (Note: If the reader is checking the learning curve computations, recall that flyaway engines and spares engines are determined from the same learning curve. Therefore, the FY 87 engine cost assumes the purchase of 80 flyaway engines and 9 additional spares engines.)

TABLE IV.1
PROGRAM CHANGES (JUNE 30, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL	CHANGES
QUANTITY (PROG)														
Airframe														
New QTY							10	20	35	35	35	35	170	
New 79\$							720.9	1111.9	1612.1	1419.2	1308.1	1231.7	7,403.9	
Prior QTY							10	20	40	40	40	-	150	
Prior 79\$							720.9	1111.9	1823.8	1590.6	1460.9	-	6,708.1	
Chg (79\$)							-	-	-211.7	-171.4	-152.8	-	+695.8	Quantity (79\$)
Index							1.421	1.508	1.599	1.695	1.796	1.904	-	
Chg (Esc \$)							-	-	-338.5	-290.5	-274.4	+2345.1	+1,441.7	
Escalation							-	-	-126.8	-119.1	-121.6	+1113.4	+745.9	+628.9 PCR Escalation (745.9 less Schedule component of 117.0 from below)
Engine														
New QTY							50	100	200	250	80	-	680	
New 79\$							140.4	234.9	415.2	474.6	144.8	-	1,409.9	
Prior QTY							50	100	200	250	-	-	600	
Prior 79\$							140.4	234.9	415.2	474.6	-	-	1,265.1	
Chg (79\$)							-	-	-	-	+144.8	-	+144.8	+144.8 Quantity (79\$)
Index							-	-	-	-	1.796	-	-	
Chg (Esc \$)							-	-	-	-	+260.1	-	+260.1	
Escalation							-	-	-	-	+115.3	-	+115.3	+115.3 PCR Escalation
Avionics														
New QTY							105.0	190.0	370.0	360.0	355.0	184.0	1,564.0	
New 79\$							105.0	190.0	370.0	360.0	355.0	-	1,380.0	
Prior QTY							-	-	-	-	-	-	+184.0	+184.0 Quantity (79\$)
Prior 79\$							-	-	-	-	-	-	-	
Index							-	-	-	-	-	-	-	
Chg (Esc \$)							-	-	-	-	-	-	+350.3	
Escalation							-	-	-	-	-	-	+166.3	+166.3 PCR Escalation
SCHEDULE (PROG)														
Airframe														
Prior QTY, New Sched							10	20	35	35	35	15	150	
New 79\$							720.9	1111.9	1612.1	1419.2	1308.1	535.9	6,708.1	
Prior QTY & Sched							10	20	40	40	40	-	150	
Prior 79\$							720.9	1111.9	1823.8	1590.6	1460.9	-	6,708.1	
Chg (79\$)							-	-	-211.7	-171.4	-152.8	+535.9	-	-0- Schedule (79\$)
Index							-	-	1.599	1.695	1.796	1.904	-	
Chg (Esc \$)							-	-	-338.5	-290.5	-274.4	+1020.4	+117.0	+117.0 PCR Escalation (Subtract from Total Escalation calculated for Quantity Change)
Escalation							-	-	-126.8	-119.1	-121.6	+484.5	+117.0	
ENGINEERING														
Development														
Airframe (After Chg)	150.0	109.2	96.5	89.1									444.8	
Airframe (Before Chg)	150.0	105.0	92.8	85.7									433.5	
Chg (79\$)	-	+4.2	+3.7	+3.4									+11.3	+11.3 Engineering (79\$)
Index	1.010	1.095	1.166										-	
Chg Esc \$	14.3	14.0	14.0	14.0									+12.3	
Escalation	10.1	10.3	10.6										+1.0	+1.0 PCR Escalation
Procurement														
Airframe (After Chg)	749.7	1156.4	1676.6	1476.0	1360.4	1281.0							7,700.1	
Airframe (Before Chg)	720.9	1111.9	1612.1	1419.2	1308.1	1231.7							7,403.9	
Chg (79\$)	+28.8	+44.5	+64.5	+56.8	+52.3	+49.3							+296.2	+296.2 Engineering (79\$)
Index	1.421	1.508	1.599	1.695	1.796	1.904							-	
Chg (Esc \$)	+40.9	+67.1	+103.1	+96.3	+91.9	+91.9							+495.2	
Escalation	+12.1	+22.6	+38.6	+39.5	+41.6	+44.6							+199.0	+199.0 PCR Escalation

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TABLE IV.1 (Cont'd)
PROGRAM CHANGES (JUNE 30, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL	CHANGES
ESTIMATING														
Development														
Airframe (After Chg) 1/	158.7	115.5	102.1	94.3									470.6	
Airframe (Before Chg) 2/	150.0	109.2	96.5	89.1									444.8	
Chg (79\$)	+8.7	+6.3	+5.6	+5.2									+25.8	+25.8 Estimating (79\$)
Index	3/	1.030	1.095	1.166									-	
Chg (Esc \$)	+8.7	+6.5	+6.1	+6.1									+27.4	
Escalation	-	+0.2	+0.5	+0.9									+1.6	+1.6 PCR Escalation
Procurement														
Airframe (After Chg) 1/							793.0	1223.1	1773.3	1561.2	1438.9	1354.9	8,144.4	
Airframe (Before Chg) 2/							749.7	1156.4	1676.6	1476.0	1360.4	1281.0	7,700.1	
Chg 79\$							+43.3	+66.7	+96.7	+85.2	+78.5	+73.9	+444.3	+444.3 Estimating (79\$)
Index							1.421	1.508	1.599	1.695	1.796	1.904	-	
Chg (Esc \$)							+61.5	+100.6	+154.6	+144.4	+141.0	+140.7	+742.8	
Escalation							+18.2	+33.9	+57.9	+59.2	+62.5	+66.8	+298.5	+298.5 PCR Escalation
Development 4/														
Other (Before Chgs)	272.6	221.2	512.4	632.2	689.3	325.0	30.0						2,682.7	
Total Eng'g & Est'y Chgs	-	-8.7	-10.5	-9.3	-	-	-						-28.5	-28.5 Estimating
To Be Absorbed														
Other (After Chg)	272.6	212.5	501.9	622.9	689.3	325.0	30.0						2,654.2	
Total PCR To Be Absorbed	-	-	-0.3	-0.9	-	-	-						-1.2	-1.2 PCR Escalation
SUPPORT														
Procurement														
Engine Spares														
New Qty							25	50	60	70	74		279	
New 79\$							70.2	117.5	124.6	132.9	133.9		579.1	
Prior Qty							25	50	60	70	65		270	
Prior 79\$							70.2	117.5	124.6	132.9	118.5		563.7	
Chg (79\$)							-	-	-	-	+15.4		+15.4	+15.4 Support (79\$)
Index													-	
Chg (Esc \$)													+27.7	
Escalation													+12.3	+12.3 PCR Escalation
DESIGN TO COST (DC)														
Airframe (Qty)							10	20	40	40	40		150	
Cost							793.0	1223.1	2006.2	1749.7	1607.0		7,379.0	
Engine (Qty)							50	100	200	250			600	
Cost							140.4	234.9	415.2	474.6			1,265.1	
Avionics							105.0	190.0	370.0	360.0	355.0		1,380.0	
Total (79\$)							1038.4	1648.0	2791.4	2584.3	1962.0		10,024.1	
Index							1.421	1.508	1.599	1.695	1.796		-	
Total (Esc \$)							\$1475.6	\$2485.2	\$4463.4	\$4380.4	\$3523.8		\$16,328.4	

1/ Theoretical first unit cost including Engineering and Estimating Changes is \$165.0, but actual first unit is only \$158.7 because the Engineering Change is not included in the first prototype.

2/ These values are before the Estimating Change but after the previously calculated Engineering Change.

3/ Recall that FY77/78 represent pre-base year actuals.

4/ These changes reflect absorbing the previously calculated Engineering and Estimating Changes within FY78-80 funding levels.

c. The avionics Quantity Change is calculated as described in paragraph B.3.b. The \$184.0 in FY 88 is based on an assumption of 20 additional avionics sets at \$9.2 each. Recall from Section II, paragraph A.1.c. that no learning is assumed for avionics.

d. The Schedule Change results from a reduction in peak annual buy quantities. To determine the Schedule Change, the previous airframe funding and schedule are compared to the funding profile of the previous quantity on the reduced buy schedule. In Table IV.1, the lines titled, Prior Qty & Sched and Prior 79\$ are taken from Table III.4. The Prior Qty, New Sched and new 79\$ lines are determined by reducing the FY 85-87 quantities to 35 each year and adding the 15 delayed airframes to the end of the buy schedule FY 88). The result is the funding profile associated with buying 150 airframes at a peak rate of 35 per year rather than 40. The difference between the two lines is the FY 79\$ (base year) value of the schedule change. Note that in this example the value is zero. This is because the costs are computed from the cost-quantity curve with an assumption of no increased cost due to reduced buys or the extra year. For relatively minor perturbations of the procurement schedule this may often be the case, especially for production estimates prepared early in the development phase. Later in the program, when detailed production estimates and contractor proposals are available, this may not be the case.

(1) As in the Quantity calculations, the annual FY 79\$ changes are escalated to determine the PCR escalation of \$+117.0.

(2) Recall from paragraph B.3.a.(3) that the airframe Quantity Change PCR escalation included the schedule effects. Therefore, the Schedule PCR escalation must be subtracted from the airframe PCR to avoid a double count. If there had been a base year dollar Schedule Change, that portion of the Schedule PCR escalation associated with the base year dollar change would not be subtracted from Quantity PCR.

e. The Engineering Change must be calculated separately for Development and Procurement.

(1) The hydraulics change will increase costs by 4 percent for the second through fourth prototype airframes. Comparing the previous airframe prototype costs from Table III.4 with the revised costs in Table IV.1 results in an Engineering Change of \$+11.3 (79\$). The PCR calculations shown are accomplished as previously described.

(2) The procurement Engineering Change is calculated the same as for the Development prototypes. The Before Change line in Table IV.1 is after the previously calculated Quantity and Schedule Changes. Therefore, the values are taken from the New 79\$ line under QUANTITY (PROC) Airframe, Table IV.1. The After Change line can be calculated by multiplying the Before Change line by 1.04 (4 percent). This is equivalent to increasing the cost-quantity curve theoretical first unit cost by 4 percent.

f. The Estimating Change must be accomplished in three parts. Airframe changes are computed separately for development and procurement. Then, the impact of absorbing FY 78-80 increases within existing funding limitations must be calculated.

(1) The Development airframe costs, including the just computed Engineering Change (the Airframe (After Chg) line under ENGINEERING, Development), is subtracted from the airframe cost with the 6 percent estimating increase. The resulting \$+25.8 (79\$) change is then escalated to arrive at PCR escalation.

(2) The airframe procurement Estimating Change is done in the same manner as the development change.

(3) Since Quantity Changes must always be related to the DE and CE cost-quantity curves, the increased FY 78-80 development costs in the development Airframe or Engine lines should not be absorbed. This means the adjustment must be made in the Other development line from Table III.4. The sum of the development Engineering and Estimating changes, by year, is subtracted from the Other line. This results in the \$-28.5 (79\$) Estimating Change shown in Table IV.1. For example, the FY 79 reduction of \$10.5 is the sum of the \$4.2 Engineering and \$6.3 Estimating Changes previously calculated for FY 79. Similarly, the PCR escalation is \$0.1 Engineering PCR and \$0.2 Estimating PCR for FY 79. (Note: The FY 80 PCR will not check exactly due to a rounding error.)

g. The Support Change in this example is for engine spares only. It is assumed that the other spares requirements have not been affected by either the Quantity Change or the Engineering and Estimating Changes to the airframe. This assumption is usually not valid but it in no way detracts from the realism of this example in terms of computational procedures. As in the preceding steps, the engine spares line from the preceding CE (Table III.4) is subtracted from the new estimate and the changes are escalated to determine PCR escalation.

h. The Design-to-Cost calculations are shown only for completeness. As noted in Section III, these calculations should be done by the program office in accordance with their program specific requirements.

4. Changes are calculated on a line item basis from the previous detailed CE. The previous line values are subtracted from the new line values to get the base year dollar value of the change. These annual line item changes are then escalated to determine PCR escalation. As the calculations proceed, any line changed in a prior calculation is used in place of the previous SAR CE line as the base from which the next variance category change is calculated. Calculations will generally follow this rolling sequence except when Schedule and Quantity for the same line change at the same time, as was the case in this example.

5. Table III.4 is now updated with the changes from Table IV.1. This results in Table IV.2, which will be the basis for future SAR variance calculations.

6. SAR Formats E, G, and H are prepared from the information in Tables IV.1 and IV.2. Tables IV.3, IV.4, and IV.5 display the results.

TABLE IV.2
CURRENT ESTIMATE (JUNE 30, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL
Development:													
Airframe													
Qty		1	1	1	1								4
Cost		158.7	115.5	102.1	94.3								470.6
Engine													
Qty	6	8	10										24
Cost	27.4	28.8	32.6										88.8
Other	272.6	212.5	501.9	622.9	689.3	325.0	30.0						2,654.2
Total 79\$	300.0	400.0	650.0	725.0	783.6	325.0	30.0						3,213.6
Index	-	-	1,030	1,095	1,166	1,243	1,323						-
Escalation	-	-	19.5	68.9	130.1	79.0	9.7						307.2
Total (Esc \$)	\$300.0	\$400.0	\$669.5	\$793.9	\$913.7	\$404.0	\$39.7						\$3,520.8
Procurement:													
Airframe													
Qty							10	20	35	35	35	35	170
Cost							793.0	1223.1	1773.3	1561.2	1438.9	1354.9	8144.4
Engine													
Qty							50	100	200	250	80	-	680
Cost							140.4	234.9	415.2	474.6	144.8	-	1,409.9
Avionics							105.0	190.0	370.0	360.0	355.0	184.0	1,564.0
Subtotal (Flyaway)							1038.4	1648.0	2558.5	2395.8	1938.7	1538.9	11,118.3
Peculiar Support							150.0	320.0	500.0	70.0	-	-	1,040.0
Other Weap. Sys. Cost							80.0	70.0	30.0	30.0	15.0	-	225.0
Initial Spares							(70.2)	(117.5)	(124.6)	(132.9)	(133.9)	-	(579.1)
Engine Cost							25	50	60	70	74	-	279
Other							(75.0)	(110.0)	(140.0)	(150.0)	(149.0)	-	(624.0)
Total Spares							145.2	227.5	264.6	282.9	282.9	-	1,203.1
Total Proc. (79\$)							\$1413.6	\$2265.5	\$3353.1	\$2778.7	\$2236.6	\$1538.9	\$13,586.4
Index							1,421	1,508	1,599	1,695	1,796	1,904	-
Escalation							595.1	1150.9	2008.5	1931.2	1780.3	1391.2	8,857.2
Total Proc. (Esc \$)							\$2008.7	\$3416.4	\$5361.6	\$4709.9	\$4016.9	\$2930.1	\$22,443.6
Construction (79\$)							100.0	150.0					250.0
Index							1,421	1,508					-
Escalation							42.1	76.2					118.3
Total Const. (Esc \$)							\$142.1	\$226.2					\$368.3

1/ See Format E, footnote 1.

TABLE IV.3
Selected Acquisition Report
System: B-X

As of Date: 30 June 1979

(Dollars in Millions)

E. Program Acquisition 1. Cost	(1) Development Estimate (FY77-86)	(2) Changes	(3) Current Estimate (FY77-88)	Funding	(4) Current & Prior Yrs	(5) Budget Year (FY80)	(6) Balance to Complete FYDP	(7) Beyond FYDP	(8) Total
Development	\$3,200.0 1/	\$+13.6	\$3,213.6	Development	\$1,369.5	\$793.9	\$1,357.4	-	\$3,520.8
Procurement	11,751.4	+1,835.0	13,586.4	Procurement	-	-	5,425.1	17,018.5	22,443.6
Airframe	6,708.1	+1,436.3	8,144.4	Construction	-	-	368.3	-	368.3
Engines	1,265.7	+144.2	1,409.9	Total	\$1,369.5	\$793.9	\$7,150.8	\$17,018.5	\$25,964.4
Avionics	1,380.0	+184.0	1,564.0						
Total Flyaway	9,353.8	+1,764.5	11,118.3	Quantity					
Peculiar Support Equip.	1,040.0	-	1,040.0	Development	2	1	1	-	4
Other Weap. Sys. Cost	225.0	-	225.0	Procurement	-	-	30	140	170
Initial Spares	1,132.6	+70.5	1,203.1	Total	2	1	31	140	174
Construction	250.0	-	250.0						
Total: Constant FY79\$	\$15,201.4 1/	\$+1,848.6	\$17,050.0						

4. Approved Design to Cost Goal: Average Flyaway Cost for 150 units at a peak production rate of 4 per month.

2. Quantities	Constant FY79\$	Escalated	Development Estimate	Approved Program	Current Estimate
Development	4	-	\$62.4	93.8	\$66.8
Procurement	150	+20	93.8	108.9	108.9
Total	154	+20			

5. Foreign Military Sales: None

3. Unit Cost	Constant FY79\$	Escalated	Development Estimate	Approved Program	Current Estimate
Development	\$78.3	+1.6	\$79.9	93.8	\$66.8
Procurement	117.1	+14.9	132.0	108.9	108.9
Total					

1/ Includes \$400.0 in FY77 and \$400.0 in FY78 actuals. \$38.7 must be added to raise total pre-base year actuals to FY79\$.

TABLE IV.4

COST VARIANCE ANALYSIS
(Dollars in Millions)As of Date: 30 June 1979
Base Year: 1979

G.	Base Year/FY79 Constant \$				REMARKS
	DEV	PROC	CONST	SUBTOTAL	
<hr/>					
Development Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1
<hr/>					
Previous Changes					
Economic	-	-	-	-	Esc: Dev. +13.2; Proc. +374.8; Const. +6.8
Schedule	+5.0	-	-	+5.0	Esc: Dev. +12.9; Proc. +1086.0; Const. +21.4
Estimating	-	-0.6	-	-0.6	Esc: Proc. -0.4
Support	-	+55.1	-	+55.1	Esc: Proc. +41.9
Subtotal	+5.0	+54.5	-	+59.5	Esc: Dev. +26.1; Proc. +1502.3; Const. +28.2
<hr/>					
Current Changes					
Quantity	-	+1,024.6	-	+1,024.6	Esc: Proc. +910.5
Schedule	-	-	-	-	Esc: Proc. +117.0
Engineering	+11.3	+296.2	-	+307.5	Esc: Dev. +1.0; Proc. +199.0
Estimating	-2.7	+444.3	-	+441.6	Esc: Dev. +0.4; Proc. +298.5
Support	-	+15.4	-	+15.4	Esc: Proc. +12.3
Subtotal	+8.6	+1,780.5	-	+1,789.1	Esc: Dev. +1.4; Proc. +1,537.3
<hr/>					
Total Changes	+13.6	+1,835.0	-	+1,848.6	Esc: Dev +27.5; Proc. +3,039.6; Const. +28.2
<hr/>					
Current Estimate	\$3,213.6	\$13,586.4	\$250.0	\$17,050.0	Esc: Dev. 307.2; Proc. 8,857.2; Const. 118.3
<hr/>					
Changes Since Previous Report:					
(Ch 1) The Current Estimate for total Program Acquisition Cost changes as follows: 1/					
<hr/>					
Development					
Hydraulic systems design changes (Engineering)				Current \$	Base Year \$
Increased prototype cost and refinement of R&D estimate (Estimating)				\$ +12.3	\$ +11.3
TOTAL Development Cost Change				\$ -2.3	\$ -2.7
				\$ +10.0	\$ +8.6
<hr/>					
PROCUREMENT					
Addition of 20 aircraft (Quantity)				+1,935.1	+1,024.6
Stretchout of FY85-87 procurement (Schedule)				+117.0	0
Hydraulic systems design changes (Engineering)				+495.2	+296.2
Revised production estimate based on prototype experience (Estimating)				+742.8	+444.3
Increased engine spares requirement due to quantity change (Support)				+27.7	+15.4
TOTAL Procurement Cost Change				\$+3,317.8	\$+1,780.5
<hr/>					
TOTAL PROGRAM COST CHANGE				\$+3,327.8	\$+1,789.1

1/ Summary explanations of "Previous Changes" are not shown in this example but are required in actual practice.

TABLE IV.5

Selected Acquisition Report

System: B-X

As of Date: 30 June 1979

II. BUDGET YEAR AND OUT YEAR PROGRAMS

Fiscal Year	Current Estimate			Escalation (Base Year FY79)				Rate 1/	
	Budget Year Thru Completion			Amount		Dev	Const.	Proc	Const
	Dev.	Proc.	Const.	Dev.	Proc.				
1980	793.9	-	-	68.9	-	6.0	-	-	-
1981	913.7	-	-	130.1	-	6.5	-	-	-
1982	404.0	-	-	79.0	-	6.6	-	-	-
1983	39.7	2,008.7	142.1	9.7	595.1	6.5	42.1	6.5	6.5
1984	-	3,416.4	226.2	-	1,150.9	-	76.2	6.4	6.4
1985	-	5,361.6	-	-	2,008.5	-	-	6.3	-
1986	-	4,709.9	-	-	1,931.2	-	-	6.0	-
1987	-	4,016.9	-	-	1,780.3	-	-	6.0	-
1988	-	2,930.1	-	-	1,391.2	-	-	6.0	-
	\$2,151.3	\$22,443.6	\$368.3	\$287.7	\$8,857.2		\$118.3		

1/ Since the annual rates shown do not incorporate spend-out rates or the compounding effect of prior years' escalation, they cannot be used to track the inflation amounts shown for applicable years.

V. CURRENT ESTIMATE CHANGES, SEPTEMBER 30, 1979

A. SITUATION

1. The FY 80 Appropriation Bill was signed by the President on September 26, 1979. The bill includes \$5.5M (escalated \$) more than originally requested. The additional money is to be used to initiate planning and demonstration of a tactical bombing/ocean control mission capability, as directed by the Congress.

2. A 60-day wildcat strike at Alpha Industries, a major avionics subcontractor, has resulted in a restructuring of test efforts in FY 79, 80, and 81. Reprogramming restrictions directed by higher headquarters require that the FY 80 restructuring be accomplished with no increase in FY 80 funding. As a consequence, escalated dollar funding is reduced by \$2.0M in FY 79 and increased by \$3.3M in FY 81.

3. A review of B-X deployment has resulted in a requirement to upgrade runways at nine of the originally planned bases and the addition of two more bases to the original basing plan. The upgrade cost is \$28.4M in FY 83 and \$45.2M in FY 84 (escalated \$). The cost of preparing the two additional bases (the bases already exist) for B-X deployment is \$52.8M (escalated \$) in FY 84.

B. VARIANCE CATEGORIES AND COMPUTATIONS

1. In accordance with DoD Instruction 7000.3 (reference (a)), the \$5.5M FY 80 addition will be footnoted on Format E. This funding plus any impact on subsequent year requirements will not be shown in the Program Acquisition Cost or related variance categories until the December 1979 SAR.

2. The strike impact will be classified as an Other Change. Use of this category is highly judgmental and in general is sharply restricted. The factors which led to this judgment include:

a. Labor disputes that seriously disrupt programs are rare. A disruption due to a wildcat strike is even more uncommon.

b. No one could have forecast a potentially disruptive dispute at Alpha Industries given its history of good labor relations and the fact its unions were under a long term agreement.

c. The occurrence and settlement of a strike is totally unrelated to the Government's planning, funding, execution, and overall management of the program.

3. The requirement to upgrade runways is an Engineering Change. DoD Instruction 7000.3 (reference (a)) generally requires construction costs associated solely with operational/site activation to be categorized in accordance with the standard variance category definitions. Since the runway upgrade can be viewed as an alteration in the physical or functional characteristics of the base, it is an Engineering Change.

4. The cost of preparing two additional bases for B-X deployment is a Support Change. Although this cost is a construction cost associated solely with operational/site activation, it is a change in overall requirements. As such, it could be viewed as an increase in the quantity of bases. DoD Instruction 7000.3 (reference (a)) requires changes in construction requirements (quantities) to be classified as support changes, thereby effectively limiting quantity changes to flyaway costs.

5. We have determined three variance categories that are to be computed in the following order: Engineering, Other, and Support.

6. Table V.1 portrays the required variance calculations.

a. The construction line from the June 1979 SAR (from Table IV.2) is subtracted from the new construction estimate to arrive at the Engineering Change in base year dollars. The annual changes are escalated to arrive at the PCR escalation.

b. To compute the Support Change, the base year dollar line including the Engineering Change is subtracted from the new construction estimate, including two additional bases that will be added in FY 84. The base year dollar change is then escalated to arrive at PCR escalation.

c. The Other Change, due to the strike delay, is a change in development cost only. The change does not impact the prototype airframe or engine costs. To determine the change, the line titled Other in Table IV.2 under Development is subtracted from the new estimate of this line. The resulting figures are then escalated to determine PCR escalation.

7. Table IV.2 should now be updated with the changes in Table V.1. The resulting Table V.2 is the basis for the next change calculations. Tables V.3, V.4, and V.5 represent SAR Formats E, G, and H and are prepared from Tables V.1 and V.2.

TABLE V.1
PROGRAM CHANGES (SEPTEMBER 30, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL	CHANGES
ENGINEERING (Const)										
New 79\$							120.0	180.0	300.0	
Prior 79\$							100.0	150.0	250.0	
Chg (79\$)							+20.0	+30.0	+50.0	+50.0 Engineering (79\$)
Index							1.421	1.508	-	
Chg (Esc \$)							+28.4	+45.2	+73.6	
Escalation							+8.4	+15.2	+23.6	+23.6 PCR Escalation
SUPPORT (Const)										
79\$ (After Chg)							120.0	215.0	335.0	
79\$ (Before Chg)							120.0	180.0	300.0	
Chg (79\$)							-	+35.0	+35.0	+35.0 Support (79\$)
Index							-	1.508	-	
Chg (Esc \$)							-	+52.8	+52.8	
Escalation							-	+17.8	+17.8	+17.8 PCR Escalation
OTHER (Development)										
Other										
New 79\$	272.6	212.5	500.0	622.9	692.1	325.0	30.0		2,655.1	
Prior 79\$	272.6	212.5	501.9	622.9	689.3	325.0	30.0		2,654.2	
Chg (79\$)	-	-	-1.9	-	+2.8	-	-		+0.9	+0.9 Other (79\$)
Index			1.030		1.166				-	
Chg (Esc \$)			-2.0		+3.3				+1.3	
Escalation			-0.1		+0.5				+0.4	+0.4 PCR Escalation

TABLE V.2
CURRENT ESTIMATE (SEPTEMBER 30, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL
Development:													
Airframe													
Qty		1	1	1	1								4
Cost		158.7	115.5	102.1	94.3								470.6
Engine													
Qty	6	8	10										24
Cost	27.4	28.8	32.6										88.8
Other	272.6	212.5	500.0	622.9	692.1	325.0	30.0						2,655.1
Total 79\$	300.0	400.0	648.1	725.0	786.4	325.0	30.0						3,214.5
Index	-	-	1.030	1.095	1.166	1.243	1.323						-
Escalation	-	-	19.4	68.9	130.6	79.0	9.7						307.6
Total (Esc \$)	\$300.0	\$400.0	\$667.5	\$793.9	\$917.0	\$404.0	\$39.7						\$3,522.1
Procurement:													
Airframe													
Qty							10	20	35	35	35	35	170
Cost							793.0	1223.1	1773.3	1561.2	1438.9	1354.9	8144.4
Engine													
Qty							50	100	200	250	80	-	680
Cost							140.4	234.9	415.2	474.6	144.8	-	1,409.9
Avionics							105.0	190.0	370.0	360.0	355.0	184.0	1,564.0
Subtotal (Flyaway)							1038.4	1648.0	2558.5	2395.8	1938.7	1538.9	11,118.3
Peculiar Support							150.0	320.0	500.0	70.0	-	-	1,040.0
Other Weap. Sys. Cost							80.0	70.0	30.0	30.0	15.0	-	225.0
Initial Spares													
Engine Cost							(70.2)	(117.5)	(124.6)	(132.9)	(133.9)	-	(579.1)
Qty							25	50	60	70	74	-	279
Other							(75.0)	(110.0)	(140.0)	(150.0)	(149.0)	-	(624.0)
Total Spares							145.2	227.5	264.6	282.9	282.9	-	1,203.1
Total Proc. (79\$)							\$1413.6	\$2265.5	\$3353.1	\$2778.7	\$2236.6	\$1538.9	\$13,586.4
Index							1.421	1.508	1.599	1.695	1.796	1.904	-
Escalation							595.1	1150.9	2008.5	1931.2	1780.3	1391.2	8,857.2
Total Proc. (Esc \$)							\$2008.7	\$3416.4	\$5361.6	\$4709.9	\$4016.9	\$2930.1	\$22,443.6
Construction (79\$)							120.0	215.0					335.0
Index							1.421	1.508					-
Escalation							50.5	109.2					159.7
Total Const. (Esc \$)							\$170.5	\$324.2					\$494.7

1/ See Format E, footnote 1.

TABLE V.3
Selected Acquisition Report
System: B-X

As of Date: 30 September 1979

(Dollars in Millions)

E.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Program Acquisition	Development	Changes	Current	Current &	Budget	Balance to	Complete	
1. Cost	Estimate		Estimate	Prior Yrs	Year	FYDP	Beyond FYDP	Total
	(FY77-86)		(FY77-88)		(FY80)			
Development	\$3,200.0 1/	\$+14.5	\$3,214.5	\$1,367.5	\$793.9 ^{2/}	\$1,360.7	-	\$3,522.1
Procurement	11,751.4	+1,835.0	13,586.4	-	-	5,425.1	17,018.5	22,443.6
Airframe	6,708.1	+1,436.3	8,144.4	-	-	494.7	-	494.7
Engines	1,265.7	+144.2	1,409.9	-	-	-	-	-
Avionics	1,380.0	+184.0	1,564.0	-	-	-	-	-
Total Flyaway	9,353.8	+1,764.5	11,118.3	-	-	\$7,280.5	\$17,018.5	\$26,460.4
Peculiar Support Equip.	1,040.0	-	1,040.0	2	1	1	-	4
Other Weap. Sys. Cost	225.0	-	225.0	-	-	30	140	170
Initial Spares	1,132.6	+70.5	1,203.1	2	1	31	140	174
Construction	250.0	+85.0	335.0	-	-	-	-	-
Total: Constant FY79\$	\$15,201.4 1/	\$+1,934.5	\$17,135.9	\$1,367.5	\$793.9	\$7,280.5	\$17,018.5	\$26,460.4
Escalation	6,187.4	+3,137.1	9,324.5	-	-	-	-	-
Total Program Cost	\$21,388.8	\$+5,071.6	\$26,460.4 (CH-1)	-	-	-	-	-
2. Quantities								
Development	4	-	4	-	-	-	-	-
Procurement	150	+20	170	-	-	30	140	170
Total	154	+20	174	2	1	31	140	174
3. Unit Cost								
Procurement:								
Constant FY79\$	\$78.3	+1.6	\$79.9	Constant FY79\$	Development	Approved	Current	
Escalated	117.1	+14.9	132.0	Escalated	Estimate	Program	Estimate	
					\$62.4	\$62.4	\$66.8	
					93.8	93.8	108.9	
Program:								
Constant FY79\$	\$98.7	-0.2	\$98.5					
Escalated	138.9	+9.5	152.1					

4. Approved Design to Cost Goal: Average Flyaway Cost for 150 units at a peak production rate of 4 per month.

5. Foreign Military Sales: None

- 1/ Includes \$400.0 in FY77 and \$400.0 in FY78 actuals. \$38.7 must be added to raise total pre-base year actuals to FY79\$.
- 2/ Congress added \$5.5 to FY80 to initiate planning for Tactical Bombing/Ocean Control mission. This change plus total program impact will be reflected in the next SAR.

TABLE V.4

COST VARIANCE ANALYSIS
(Dollars in Millions)As of Date: 30 September 1979
Base Year: 1979

G.	Base Year/FY79 Constant \$				REMARKS		
	DEV	PROC	CONST	SUBTOTAL			
Development Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	\$6,187.4	\$21,388.8	Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1
Previous Changes							
Economic	-	-	-	-	+394.8	+394.8	Esc: Dev. +13.2; Proc. +374.8; Const. +6.8
Quantity	-	+1,024.6	-	+1,024.6	+910.5	+1,935.1	Esc: Proc. +910.5
Schedule	+5.0	-	-	+5.0	+1,237.3	+1,242.3	Esc: Dev. +12.9; Proc. +1203.0; Const. +21.4
Engineering	+11.3	+296.2	-	+307.5	+200.0	+507.5	Esc: Dev. +1.0; Proc. +199.0
Estimating	-2.7	+443.7	-	+441.0	+298.5	+739.5	Esc: Dev. +0.4; Proc. +298.1
Support	-	+70.5	-	+70.5	+54.2	+124.7	Esc: Proc. +54.2
Subtotal	+13.6	+1,835.0	-	+1,848.6	+3,095.3	+4,943.9	Esc: Dev. +27.5; Proc. +3039.6; Const. +28.2
Current Changes							
Engineering	-	-	+50.0	+50.0	+23.6	+73.6	Esc: Const. +23.6
Other	+0.9	-	-	+0.9	+0.4	+1.3	Esc: Dev. +0.4
Support	-	-	+35.0	+35.0	+17.8	+52.8	Esc: Const. +17.8
Subtotal	+0.9	-	+85.0	+85.9	+41.8	+127.7	Esc: Dev. +0.4; Const. +41.4
(CH-1)							
Total Changes	+14.5	+1,835.0	+85.0	+1,934.5	+3,137.1	+5,071.6	Esc: Dev. +27.9; Proc. +3039.6; Const. +69.6
Current Estimate	\$3,214.5	\$13,586.4	\$335.0	\$17,135.9	\$9,324.5	\$26,460.4	Esc: Dev. +307.6; Proc. +8857.2; Const. +159.7

Changes Since Previous Report:

(Ch 1) The Current Estimate for total Program Acquisition Cost changes as follows: 1/

	Current \$	Base Year \$
<u>Development</u>		
60 day strike at vendor's facility (Alpha Industries) has resulted in restructuring of test efforts (Other)	\$ +1.3	\$ +0.9
<u>CONSTRUCTION</u>		
Upgrade runways at 9 bases (Engineering)	\$ +73.6	+50.0
Added 2 bases to B-X deployment requirements (Support)	+52.8	+35.0
TOTAL Construction Cost Change	\$+126.4	\$+85.0
TOTAL PROGRAM COST CHANGE	\$+127.7	\$+85.9

1/ Summary explanations of "Previous Changes" are not shown in this example but are required in actual practice.

TABLE V.5

Selected Acquisition Report

System: B-X

As of Date: 30 September 1979

H. BUDGET YEAR AND OUT YEAR PROGRAMS

Fiscal Year	Current Estimate		Escalation (Base Year FY79)				Rate 1/	
	Budget Year Thru Completion		Amount		Dev		Proc	
	Dev.	Const.	Dev.	Const.	Dev.	Const.	Proc	Const
1980	793.9	-	68.9	-	6.0	-	-	-
1981	917.0	-	130.6	-	6.5	-	-	-
1982	404.0	-	79.0	-	6.6	-	-	-
1983	39.7	2,008.7	9.7	170.5	6.5	50.5	6.5	6.5
1984	-	3,416.4	-	324.2	-	109.2	6.4	6.4
1985	-	5,361.6	-	-	-	-	6.3	-
1986	-	4,709.9	-	-	-	-	6.0	-
1987	-	4,016.9	-	-	-	-	6.0	-
1988	-	2,930.1	-	-	-	-	6.0	-
	\$2,154.6	\$22,443.6	\$288.2	\$494.7	\$8,857.2	\$159.7		

1/ Since the annual rates shown do not incorporate spend-out rates or the compounding effect of prior years' escalation, they cannot be used to track the inflation amounts shown for applicable years.

VI. CURRENT ESTIMATE CHANGES, DECEMBER 31, 1979

A. SITUATION

1. The FY 81 PPBS process has resulted in three changes to the CE.

a. Escalation rates for the FY 81 budget and subsequent years have been revised. The new annual rates and resultant composite rates are shown in Table VI.1. There have been no changes in outlay rate assumptions from those displayed in Table II.3.

Fiscal Year	Annual Rate(%)	Price Level Index	Composite Indices		
			RDT&E	Procurement	Construction
1977	6.0	0.890	0.917	-	-
1978	6.0	0.943	0.972	-	-
1979	6.0	1.000	1.030	-	-
1980	6.0	1.060	1.095	-	-
1981	6.5	1.129	1.168	-	-
1982	6.8	1.206	1.247	-	-
1983	6.8	1.288	1.331	1.432	1.432
1984	6.7	1.374	-	1.522	1.522
1985	6.4	1.462	-	1.615	-
1986	6.2	1.552	-	1.712	-
1987	6.0	1.646	-	1.815	-
1988	6.0	1.744	-	1.924	-
1989	6.0	1.849	-	-	-
1990	6.0	1.960	-	-	-
1991	6.0	2.078	-	-	-
1992	6.0	2.202	-	-	-

TABLE VI.1 Indices

b. The quantity of production aircraft has been reduced from 170 to 160. In addition, the peak annual procurement has been increased from 35 per year to 40. The new airframe cost and schedule are shown in Table VI.2. As a result of the reduced aircraft buy, engine procurement is reduced by 40 engines in FY 87 (\$130.9M, Escalated \$), avionics are reduced by \$180.5M (Escalated \$) in FY 88, and engine spares are reduced by 16 engines in FY 87 (\$51.5M, Escalated \$).

	<u>FY 83</u>	<u>FY 84</u>	<u>FY 85</u>	<u>FY 86</u>	<u>FY 87</u>	<u>FY 88</u>	<u>Total</u>
Airframe:							
Qty	10	20	40	40	40	10	160
Cost	\$1135.6	\$1861.6	\$3240.0	\$2995.5	\$2916.7	\$741.5	\$12890.9

TABLE VI.2 Airframe Funding (Escalated \$)

c. The Congressionally directed demonstration of a tactical bombing/ocean control mission capability is to be included. The revised development funding amounts for the years FY 80-83 are \$799.3M, \$927.9M, \$409.0M, and \$39.9M, respectively, all in escalated dollars.

2. The dollars provided in paragraphs A.1.b. and A.1.c. reflect the FY 81 budget submission and include escalation per the indices in Table VI.1.

B. VARIANCE CATEGORIES AND COMPUTATIONS

1. Review of the required changes indicates six variance categories will be required: Economic, Quantity, Schedule, Engineering, Estimating, and Support. By appropriation, Economic is required for all three appropriations (RDT&E, procurement, construction); Estimating in RDT&E and procurement; and Quantity, Schedule, Engineering, and Support in procurement only. The requirement for Estimating and Engineering Changes in procurement may not be readily apparent. This requirement stems from the fact that the Quantity Change adjustment involves the use of DE and CE cost-quantity curves that are no longer identical. The difference between the DE and CE cost-quantity calculations must be allocated to the Estimating and Engineering Change categories. In addition, there is the problem of a quantity reduction. DoD Instruction 7000.3 (reference (a)) requires that any time a change results in a net cost reduction, escalation associated with the reduction must be reported as an Economic Change to the extent such escalation was previously reflected in the CE.

a. The change in indices is an Economic Change.

b. The quantity reduction is a Quantity Change. However, in addition to reducing the quantity, procurement schedule is accelerated. This means that the 160 remaining aircraft will be procured sooner than if they were procured based on the September 1979 procurement schedule that limited the peak annual buy to 35. This is a Schedule Change.

c. In determining the Economic Change associated with the cost reduction, notice that we need only address those previous Economic Changes that have affected the last 10 aircraft (units 161 through 170). Recall that these units were not included in the program until the June 1979 SAR. Since the only Economic Change prior to now occurred in the December 1978 report, there have been no previous economic changes associated with these units. However, there is an Economic Change in this report. Since the Economic Change must be calculated before we incorporate any other changes, remember to adjust the Economic Change for the quantity reduction.

d. Since the Quantity Change must be computed from the DE cost-quantity curves, the magnitude of the change will be underrated. This is corrected by subtracting the DE based Quantity Change from the change as calculated from the CE cost-quantity curves. The difference must then be allocated to the Schedule, Engineering, Estimating, and Other categories. Reviewing these change categories shows that the schedule for the 10 aircraft to be deleted has never changed, and there have never been any Other changes

in procurement. The CE cost of these 10 aircraft does, however, include the impact of the Engineering and Estimating Changes made in the June 1979 SAR. Therefore, the excess Quantity Change, or the difference between the DE and CE, is allocated to the Engineering and Estimating categories.

e. The engine spares requirement has been reduced as a result of the aircraft reduction. This is a Support Change because spares are not part of flyaway cost. Changes in nonflyaway costs (except for some construction cost changes) are always classified as Support Changes.

f. In summary, we have six categories to compute. However, categories that result strictly from an allocation need not be calculated in the required order. The procedure will be to calculate the basic program changes in the following order: Economic, Quantity, Schedule, Estimating, and Support. After the Schedule Change is calculated, the Quantity PCR escalation is adjusted for the Schedule component as we did in Section IV, paragraph B.3.d.(2). The Economic Change adjustment caused by the quantity reduction will then be determined. Next, the excess Quantity Change allocation will be computed. Finally, the allocations are applied to the basic changes and the procedure is complete.

2. Table VI.3 displays the basic change calculations.

a. The Economic Change is calculated exactly as described in Section III, paragraph B.2.a. The September 1979 SAR escalation amounts (by appropriation from Table V.2) are subtracted from figures that reflect what the September escalation amounts would have been had the new indices (Table VI.1) been used. Note that this calculation is based on the September program for 170 aircraft. We will have to reduce the procurement Economic Change by the amount related to the 10 aircraft that are being deleted. This adjustment will be determined later.

b. Because the DE and CE cost-quantity curves are different (because of the June 1979 Engineering and Estimating Changes), calculate the impact due to the quantity reduction in two steps.

(1) First, deescalate the new airframe cost figures from Table VI.2. The New 79\$ (CE cost-quantity curve) line in Table VI.3 shows the result. From this line we subtract the prior 79\$ (CE cost-quantity curve) values from Table V.2. The result is \$-380.0M (79\$) for the change. The annual changes are then escalated to determine the PCR escalation of \$-481.4M. As was the case in Section IV, paragraph B.3.a.(3), the PCR total includes the impact of the accelerated schedule. This correction will be determined later under Schedule Change.

(2) Using the DE cost-quantity curve and the new schedule and quantity (160 airframes), we get the values shown in the table on the line titled, New 79\$ (Orig. cost-quantity curve). From this, subtract the costs of the September 1979 170 airframe program and schedule based

TABLE VI.3
PRICING CHANGES (DECEMBER 31, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL	CHANGES
SEPT ROTAE (79S)	\$100.0	\$400.0	\$600.0	\$725.0	\$766.4	\$125.0	\$10.0						\$2,655.1	
New Index	-	-	1,010	1,095	1,168	1,247	1,331							
New Esc	-	-	19.4	68.9	122.1	80.1	9.9						110.6	
Previous Esc	-	-	-	-	-	-	-						307.6	
Econ Chg	-	-	-	-	-	-	-						+3.0	+3.0 Economic (NOTAE)
SEPT PMAC (79S)														
New Index														
New Esc														
Previous Esc														
Econ Chg														
SEPT CONST (79S)														
New Index														
New Esc														
Previous Esc														
Econ Chg														
TOTAL ECON CHG														
QUANTITY (PMAC)														
Airframe														
New Qty & Sched														
Prior Qty & Sched														
Prior Qty (CE cost/qty curve)														
Prior Qty (CE cost/qty curve)														
Actual Chg (79S)														
Index														
Chg (Esc 5)														
Escalation														
New Qty (Qty cost/qty curve)														
Prior Qty (Qty cost/qty curve)														
Qty Chg (79S)														
Qty Chg (Esc 5)														
Qty Escalation														
Engine														
New Qty														
New Qty														
Prior Qty														
Prior Qty														
Chg 79S														
Index														
Chg Esc 5														
Escalation														
Avionics														
New Qty														
Prior Qty														
Chg 79S														
Index														
Chg Esc 5														
Escalation														
SCHEDULE (PMAC)														
Airframe														
Prior Qty, New Sched														
New Qty														
Prior Qty & Sched														
Prior Qty														
Chg (79S)														
Index														
Chg Esc 5														
Escalation														
Avionics														
Prior Qty, New Sched														
New Qty														
Prior Qty & Sched														
Prior Qty														
Chg (79S)														
Index														
Chg Esc 5														
Escalation														

1/ In Index -100.0 to include PCR escalation calculation. Quantity PCR based on the CE cost/quantity curve is, therefore, calculated as: $401.4 \times (-100.0) = -40,140.0$

2/ In Index Schedule PCR escalation of -100.0 to include PCR escalation calculation. Quantity PCR based on the CE cost/quantity curve is, therefore, calculated as: $401.4 \times (-100.0) = -40,140.0$

TABLE VI.3 (Continued)
PROGRAM CHANGES (DECEMBER 31, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL	CHANGES
ESTIMATING (Development)														
Other (After Chg)	\$272.6	\$212.5	\$500.0	\$627.9	\$700.1	\$328.0	\$30.0						\$2,671.1	
Other (Before Chg)	272.6	212.5	500.0	622.9	692.1	325.0	30.0						2,655.1	
Chg (79\$)	-	-	-	+5.0	+8.0	+3.0	-						+16.0	+16.0 Estimating (79\$)
Index				1.095	1.168	1.247							-	
Chg (Esc \$)				+5.5	+9.3	+3.7							+18.5	
Escalation				+0.5	+1.3	+0.7							+2.5	+2.5 PCR Escalation
SUPPORT (PROCI)														
Engine Spares														
New Qty							25	50	60	70	58		263	
New 79\$							70.2	117.5	124.6	132.9	105.5		550.7	
Prior Qty							25	50	60	70	74		279	
Prior 79\$							70.2	117.5	124.6	132.9	133.9		579.1	
Chg 79\$							-	-	-	-	-28.4		-28.4	-28.4 Support (79\$)
Index											1.815		-	
Chg (Esc \$)											-51.5		-54.6	
Escalation											-23.1		-23.1	-23.1 PCR Escalation (Before Economic Adjustment)
DESIGN TO COST (CE)														
Airframe Qty							10	20	40	40	40		150	
Cost							793.0	1223.1	2006.2	1749.7	1607.0		7,379.0	
Engine Qty							50	100	200	250			600	
Cost							140.4	234.9	415.2	474.6			1,265.1	
Avionics							105.0	190.0	370.0	360.0	355.0		1,380.0	
Total 79\$							\$1038.4	\$1648.0	\$2791.4	\$2584.3	\$1962.0		\$10,024.1	
Index							1.432	1.522	1.615	1.712	1.815		-	
Total (Esc \$)							\$1487.0	\$2508.3	\$4508.1	\$4424.3	\$3561.0		\$16,488.7	

on the original (DE) curve. In this case, Table IV.1 for the June 1979 SAR has the required values in the second line entry under QUANTITY (PROC). (Note: These values can be used only because there have been no Schedule Changes since the last Quantity Change. If the schedule had changed in the interim, the base year dollar total from Table IV.1 would have been correct, but the annual amounts would have to be rephased to reflect the Schedule Changes.) The result of the DE-based subtraction is \$-345.4M. This is the base year dollar value of the Quantity Change. The difference between this value and the CE based change (\$-380.0M) is \$-34.6M and is the amount to be allocated to the Engineering and Estimating variance categories. The allocation will be done later. The DE-based changes are escalated to determine the PCR escalation total of \$-437.6M under the TOTAL column in Table VI.3. As was the case in paragraph B.2.b.(1), this total contains Schedule related escalation, the amount of which will be determined in the subsequent Schedule Change calculations.

c. Since the engine CE cost-quantity curve is unchanged from the DE curve, compute the engine quantity reduction in a single step. The September engine line from Table V.2 is subtracted from the new engine line (the new line is the September line changed by the information in paragraph A.1.b.). The difference is then escalated to determine the engine portion of PCR escalation. If the reader is recomputing cost-quantity curves, remember to include spares per Table II.1 footnote 5.

d. The Avionics Change is calculated from the same sources and in the same manner as for engines.

e. Only the airframe schedule has changed. Fewer engines and avionics sets are being procured, but those being procured are on the same schedule as in the September SAR.

(1) The September SAR airframe program from Table V.2 is subtracted from a line representing the September 170 airframe buy, rephased to the new higher rate schedule. Again, as was the case in Section IV, paragraph B.3.d., the base year dollars have not changed. However, the rephasing does result in PCR escalation of \$-130.3. This escalation was included in the \$-481.4 PCR escalation calculated in paragraph B.2.b.(1) and should now be subtracted from that total. The resulting \$-351.1M PCR Escalation (Before Economic Adjustment) is shown in the CHANGES column of Table VI.3 (see footnote 1 of this table).

(2) Since the Schedule Change is based on the CE, the resulting Schedule PCR escalation was subtracted in paragraph B.2.e.(1) from the total CE based PCR escalation. Now determine what part of the Schedule PCR escalation relates only to the DE-based Quantity Change PCR escalation of \$-437.6M. The easiest way to do this is to split the Schedule PCR of \$-130.3M by the ratio of DE Quantity PCR and CE Quantity PCR as follows:

$$\frac{\text{DE PCR}}{\text{CE PCR}} \times (\text{Schedule PCR}) = \text{DE Schedule PCR}$$

$$\begin{array}{r} \$-437.6 \\ \$-481.4 \end{array} \times (\$-130.3) = \$-118.4$$

The resulting \$-118.4M represents the DE-based portion of the total Schedule PCR of \$-130.3M. The \$-118.4M should be subtracted from the DE-based Quantity PCR of \$-437.6M resulting in a net DE Quantity PCR of \$-319.2M as shown in the CHANGES column of Table VI.3 (see footnote 2 of the table).

f. Before calculating the Estimating Change for the Congressionally directed tactical bombing/ocean control demonstration, the funding estimate in paragraph A.1.c. should be deescalated to base year dollars. Subtracting the September 1979 base year dollar estimate for development (from Table V.2) yields the total change in base year dollars in Table VI.4. Since these changes do not affect prototype costs, they must be applied to the Other line of the development cost shown in Table V.2. Table VI.3 shows the Other lines before and after the change. The differences are then escalated to arrive at PCR escalation.

	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Esc \$	799.3	927.9	409.0	39.9
79\$	730.0	794.4	328.0	30.0
Less Sept. Est (79\$)	<u>725.0</u>	<u>786.4</u>	<u>325.0</u>	<u>30.0</u>
Change (79\$)	+5.0	+8.0	+3.0	-

TABLE VI.4 Development Cost Change

g. Support Change is calculated as the reduction in cost associated with 16 fewer spares engines per paragraph A.1.b. Subtracting the September engine spares line from the new line and escalating the difference results in the Support Change and PCR as shown in Table VI.3.

h. The design-to-cost calculation is shown, as before, only for completeness.

3. The basic estimates of all changes and PCR escalation are now complete. The procedures have been identical to those used in prior sections of this appendix. We must now compute the allocations required by the quantity reduction and the fact that the DE and CE cost-quantity curves are different.

C. ECONOMIC CHANGE RELATED TO COST REDUCTION

1. The cost reduction requires an adjustment to the Economic Change for the reasons discussed in paragraphs B.1. and B.1.c. In this example, the Economic adjustment is required only because of the Economic Change made in this iteration. However, the procedure is identical to the case where one or more economic changes are made prior to the SAR in which the cost reduction occurs. The procedure used in this example is not mandatory. It merely portrays a means of approximating the required allocations. The

analyst may use other approximations that suit the specific situation and available information. The procedure should not distort the result, however, and should recognize that economic changes have a greater impact on effort in the later stages of a program than on effort in the earlier stages. The following procedure is used in this example:

a. Identify the total prior economic changes by appropriation that have affected the units or effort now being reduced. In this example, only the change determined in paragraph B.2.a. affected units 161-170. This is \$+221.4M and is for procurement only (from Table VI.3). The December 1978 Economic Change did not affect these units because they were not in the program at that time. When they were added in June 1979, all associated escalation was identified as PCR escalation.

b. Divide the value identified in paragraph C.1.a. by the total program escalation for the appropriation being reduced. In this example, total escalation can be obtained from Format G of the September 1979 SAR (Table V.4). From the REMARKS column of Table V.4 total procurement escalation was \$8,857.2M prior to the December 1979 changes. To this we must add the \$+221.4M Economic for this SAR for a total procurement escalation of \$9,078.6M. Dividing this into the \$221.4M from paragraph C.1.a. and multiplying this ratio by 100 yields the percent of total escalation that is associated with the effort being reduced, 2.4 percent.

c. The derived percentage is then applied to the total basic PCR escalation calculated for the reduction to arrive at the amount of Economic adjustment required. In this example, total PCR related to the reductions is the sum of \$-351.1M (airframe Quantity PCR before cost-quantity curve allocation), \$-58.8M (engine Quantity PCR), \$-86.7M (avionics Quantity PCR), \$-130.3 (airframe Schedule PCR), and \$-23.1M (engine spares Support PCR). The total reduction related PCR escalation is \$-650.0M; 2.4 percent of \$-650.0M is \$-15.6M and is the amount of the required Economic adjustment.

2. Adjust the PCR escalation amounts calculated for each variance category by line item. Table VI.5 shows the adjustments for this example. The last column of the table shows the variance category PCR escalation amounts resulting from the \$-15.6M change to the Economic Change category.

	Initial PCR Escalation From Table VI.3	Percent of Total	Reduction Amount $\frac{\%}{100} \times 15.6$	Net PCR
Airframe (Qty)	\$-351.1	54.0	\$-8.4	\$-342.7
Engine (Qty)	-58.8	9.0	-1.4	-57.4
Avionics (Qty)	-86.7	13.3	-2.1	-84.6
Airframe (Sch)	-130.3	20.1	-3.1	-127.2
Engine Spares (Spt)	-23.1	3.6	-0.6	-22.5
Total	\$-650.0	100.0	\$-15.6	\$-634.4

TABLE VI.5 Economic Adjustment

D. EXCESS AIRFRAME QUANTITY VARIANCE

1. Since the DE and CE cost-quantity curves differ, we calculated the impact of the airframe quantity reduction shown in Table VI.3 from both curves. The SAR Quantity variance category is limited solely to changes resulting from the DE curve. The difference between the DE and CE calculations must be allocated to the other variance categories. As in paragraph C., the procedure in this example is an approximation and is not mandatory.

a. First, identify the amounts to be allocated. In this example the allocation totals are obtained from Table VI.3 as follows:

(1) The DE-based change of \$-345.4M (79\$) is subtracted from the CE-based change of \$-380.0M (79\$) for an allocation amount of \$-34.6M (79\$).

(2) The amount of PCR escalation to be allocated is complicated by the Economic adjustment described in paragraph C. The amount of PCR to be allocated is the difference between the DE and CE Quantity Change PCR figures. However, the CE PCR of \$-351.1M was reduced by \$8.4 in paragraph C.2. Determine how much of the \$8.4 Economic adjustment pertains to the DE-based PCR that was initially calculated as \$-319.2. Do this by pro-rating the \$8.4 adjustment based on the DE and CE PCR ratio:

$$\frac{\text{DE PCR } (\$-319.2)}{\text{CE PCR } (\$-351.1)} \times (\$-8.4) = \$-7.6$$

Therefore, \$-7.6 of the total \$-8.4 applies to the DE estimate of PCR. \$-319.2 minus \$-7.6 yields an adjusted DE PCR of \$-311.6. The PCR to be allocated is then the CE PCR minus the DE PCR: the adjusted CE PCR of \$-342.7 (from Table VI.5) less the adjusted DE PCR of \$-311.6 or \$-31.1.

(3) In summary, allocate \$-34.6 in base year dollars and \$-31.1 in PCR escalation.

b. Identify the categories to which the allocation must be made. In paragraph B.1.d., the Engineering and Estimating categories were identified to receive the allocation. To the extent practicable, we should identify only those Engineering and Estimating Changes associated with the airframe. Reviewing the Current Changes entries for all prior SAR submissions reveals that only the Engineering and Estimating Changes in the June 1979 SAR apply to the airframe.

(1) The total base year dollar Engineering and Estimating Changes in procurement are taken from Format G of the June 1979 SAR, Table IV.4. Using the ratio of each change category to the total Engineering and Estimating Changes, multiply by the amount to be allocated to arrive at the required distribution shown in Table VI.6.

	<u>Total 79\$ Changes</u>	<u>Ratio of Change to Total</u>	<u>1979\$ To Be Allocated</u>	<u>= 1979\$ Allocation</u>
Engineering	\$+296.2	0.40	\$-34.6	\$-13.8
Estimating	<u>+444.3</u>	<u>0.60</u>	-34.6	<u>-20.8</u>
Total	\$+740.5	1.00		\$-34.6

TABLE VI.6 Excess Quantity Allocation
(Base Year Dollars)

(2) The PCR allocation is done in the same fashion as for base year dollars except the ratios on the PCR amounts are based from the REMARKS column of Table IV.4 for the allocation categories. The procedure is illustrated in Table VI.7.

	<u>Prior PCR Escalation</u>	<u>Ratio of PCR to Total PCR</u>	<u>PCR To Be Allocated</u>	<u>= PCR Allocation</u>
Engineering	\$+199.0	0.40	\$-31.1	\$-12.4
Estimating	<u>+298.5</u>	<u>0.60</u>	-31.1	<u>-18.7</u>
Total	\$+497.5	1.00		\$-31.1

TABLE VI.7 Excess Quantity PCR Escalation Allocation

(3) The allocation ratios for base year dollars and PCR escalation are the same. This is due to the changes that affected the program in a constant proportional manner over identical timeframes (a 4 percent Engineering Change and a 6 percent Estimating Change). Because this will not always be the case, the analyst should always allocate the base year and PCR escalation amounts separately. For example, all of the procurement Schedule Changes in this example have resulted in PCR escalation with no changes in base year dollars. Had the Schedule Changes affected the deleted airframes, PCR escalation allocation would be made to Schedule if only the base year dollar ratios had been used because the Schedule ratio would have been 0. This would clearly have been an improper allocation.

E. SUMMARY

1. The changes in Tables VI.3, VI.5, VI.6, and VI.7 are summarized in Table VI.8.

2. The line item changes by year from Table VI.3 are added to Table V.2 to arrive at Table VI.9. Tables VI.8 and VI.9 are used to prepare SAR Formats E, G, and H shown as Tables VI.10, VI.11, and VI.12, respectively.

TABLE VI.8
SUMMARY OF CHANGES AND ADJUSTMENTS

	Development		Procurement		PCR Escalation		Construction	
	1979\$	PCR	1979\$	PCR	Before Economic Adjustment	After Economic Adjustment	1979\$	PCR
Economic Quantity	-	+3.0	-		+221.4	+205.8 1/	-	+4.3
Airframe			-345.4		-319.2	-311.6		
Engine			-72.1		-58.8	-57.4		
Avionics			-93.6		-86.7	-84.6		
Schedule			-		-130.3	-127.2		
Engineering			-13.8		-12.7	-12.4		
Estimating	+16.0	+2.5	-20.8		-19.2	-18.7		
Support			-28.4		-23.1	-22.5		
Total	+16.0	+5.5	+574.3		-428.6	-428.6	-	+4.3

1/ Procurement Economic Change of +221.4 less adjustment for prior Economic associated with negative cost changes of -15.6 (from paragraph C.1.c.) = +221.4 - (-15.6) = +205.8

TABLE VI.9
CURRENT ESTIMATE (DECEMBER 31, 1979)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL
Development:													
Airframe													
Qty		1	1	1	1								4
Cost		158.7	115.5	102.1	94.3								470.6
Engine													
Qty	6	8	10										24
Cost	27.4	28.8	32.6										88.8
Other	272.6	212.5	500.0	627.9	700.1	328.0	30.0						2,671.1
Total 79\$	300.0	400.0	648.1	730.0	794.4	328.0	30.0						3,230.5
Index	-	-	1.030	1.095	1.168	1.247	1.331						-
Escalation	-	-	19.4	69.3	133.5	81.0	9.9						313.1
Total (Esc \$)	\$300.0	\$400.0	\$667.5	\$799.3	\$927.9	\$409.0	\$39.9						\$3,543.6
Procurement:													
Airframe													
Qty							10	20	40	40	40	10	160
Cost							793.0	1223.1	2006.2	1749.7	1607.0	385.4	7,764.4
Engine													
Qty							50	100	200	250	40	-	640
Cost							140.4	234.9	415.2	474.6	72.7	-	1,337.8
Avionics							105.0	190.0	370.0	360.0	355.0	90.2	1,470.2
Subtotal (Plyaway)							1038.4	1648.0	2791.4	2584.3	2034.7	475.6	10,572.4
Peculiar Support							150.0	320.0	500.0	70.0	-	-	1,040.0
Other Weap. Sys. Cost							80.0	70.0	30.0	30.0	15.0	-	225.0
Initial Spares													
Engine Cost							(70.2)	(117.5)	(124.6)	(132.9)	(105.5)	-	(550.7)
Other							25	50	60	70	58	-	263
Total Spares							(75.0)	(110.0)	(140.0)	(150.0)	(149.0)	-	(624.0)
Total Proc. (79\$)							145.2	227.5	264.6	282.9	254.5	-	1,174.7
Index							\$1413.6	\$2265.5	\$3586.0	\$2967.2	\$2304.2	\$475.6	\$13,012.1
Escalation							1.432	1.522	1.615	1.712	1.815	1.924	-
Total Proc. (Esc \$)							610.7	1182.6	2205.4	2112.6	1877.9	439.4	8,428.6
Construction (79\$)							\$2024.3	\$3448.1	\$5791.4	\$5079.8	\$4182.1	\$915.0	\$21,440.7
Index							120.0	215.0					335.0
Escalation							1.432	1.522					-
Total Const. (Esc \$)							51.8	112.2					164.0
							\$171.8	\$327.2					\$499.0

1/ See Format E, footnote 1.

TABLE VI.10

Selected Acquisition Report

System: B-X

As of Date: 31 December 1979

(Dollars in Millions)

E. Program Acquisition 1. Cost	(1) Development Estimate (FY77-86)	(2) Changes	(3) Current Estimate (FY77-88)	Funding	(4) Current & Budget Prior Yrs (FY81)	(5) Budget Year (FY81)	(6) Balance to Complete FYDP	(7) Beyond FYDP	(8) Total
Development	\$3,200.0 1/	\$+30.5	\$3,230.5 1/	Development	\$2,166.8	\$927.9	\$448.9	-	\$3,543.6
Procurement	11,751.4	+1,260.7	13,012.1	Procurement	-	-	11,263.8	10,176.9	21,440.7
Airframe	6,708.1	+1,056.3	7,764.4	Construction	-	-	499.0	-	499.0
Engines	1,265.7	+72.1	1,337.8	Total	\$2,166.8	\$927.9	\$12,211.7	\$10,176.9	\$25,483.3
Avionics	1,380.0	+90.2	1,470.2	Quantity					
Total Flyaway	9,353.8	+1,218.6	10,572.4	Development	3	1	-	-	4
Peculiar Support Equip.	1,040.0	-	1,040.0	Procurement	-	-	70	90	160
Other Weap. Sys. Cost	225.0	-	225.0	Total	3	1	70	90	164
Initial Spares	1,132.6	+42.1	1,174.7						
Construction	250.0	+85.0	335.0						
Total: Constant FY79\$	\$15,201.4 1/	\$+1,376.2	\$16,577.6 1/						
Escalation	6,187.4	+2,718.3	8,905.7						
Total Program Cost	\$21,388.8	\$+4,094.5	\$25,483.3 (CH-1)						
2. Quantities									
Development	4	-	4						
Procurement	150	+10	160						
Total	154	+10	164						
3. Unit Cost									
Procurement:									
Constant FY79\$	\$78.3	+3.0	\$81.3						
Escalated	117.1	+14.9	134.0						
Program:									
Constant FY79\$	\$98.7	+2.3	\$101.1						
Escalated	138.9	+12.8	\$155.4						
4. Approved Design to Cost Goal:									
Average Flyaway Cost for 150 units at a peak production rate of 4 per month.									
Development Estimate									
Constant FY79\$									
Escalated									
5. Foreign Military Sales:									
None									

1/ Includes \$300.0 in FY77 and \$400.0 in FY78 actuals. \$38.7 must be added to raise total pre-base year actuals to FY79\$.

TABLE VI.11
COST VARIANCE ANALYSIS
(Dollars in Millions)

As of Date: 31 December 1979
Base Year: 1979

G.	Base Year/FY79 Constant \$				REMARKS
	DEV	PROC	CONST	SUBTOTAL	
Development Estimate	\$3,200.0	\$11,751.4	\$250.0	\$15,201.4	\$6,187.4 \$21,388.8 Esc: Dev. 279.7; Proc. 5817.6; Const. 90.1
Previous Changes					
Economic	-	-	-	-	Esc: Dev. +13.2; Proc. +374.8; Const. +6.8
Quantity	-	+1,024.6	-	+1,024.6	Esc: Proc. +910.5
Schedule	+5.0	-	-	+5.0	Esc: Dev. +12.9; Proc. +1203.0; Const. +21.4
Engineering	+11.3	+296.2	+50.0	+357.5	Esc: Dev. +1.0; Proc. +199.0; Const. +23.6
Estimating	-2.7	+443.7	-	+441.0	Esc: Dev. +0.4; Proc. +298.1
Other	+0.9	-	-	+0.9	Esc: Dev. +0.4
Support	-	+70.5	+35.0	+105.5	Esc: Proc. +54.2; Const. +17.8
Subtotal	+14.5	+1,835.0	+85.0	+1,934.5	Esc: Dev. +27.9; Proc. +3,039.6; Const. +69.6
Current Changes					
Economic	-	-	-	-	Esc: Dev. +3.0; Proc. +205.8; Const. +4.3
Quantity	-	-511.3	-	-511.3	Esc: Proc. -453.6
Schedule	-	-	-	-	Esc: Proc. -127.2
Engineering	-	-13.8	-	-13.8	Esc: Proc. -12.4
Estimating	+16.0	-20.8	-	-4.8	Esc: Dev. +2.5; Proc. -18.7
Support	-	-28.4	-	-28.4	Esc: Proc. -22.5
Subtotal	+16.0	-574.3	-	-558.3	Esc: Dev. +5.5; Proc. -428.6; Const. +73.9
Total Changes	+30.5	+1,260.7	+85.0	+1,376.2	Esc: Dev. +33.4; Proc. +2,611.0; Const. +73.9
Current Estimate	\$3,230.5	\$13,012.1	\$335.0	\$16,577.6	Esc: Dev. 313.1; Proc. 8,428.6; Const. 164.0
Changes Since Previous Report:					
(Ch 1) The Current Estimate for total Program Acquisition Cost changes as follows: 1/					
Development					
Revised escalation indices (Economic)					Current \$ Base Year \$
Compressively directed requirement to demonstrate tactical bombing/ocean control capability (Estimating)					\$+ 3.0 \$ -
TOTAL Development Cost Change					+ 18.5 + 16.0
					\$+ 21.5 \$+ 16.0
PROCUREMENT					
Revised escalation indices (Economic)					\$+ 205.8 \$ -
Reduction in aircraft buy from 170 to 160 (Quantity)					- 964.9 -511.3
Accelerated procurement schedule (Schedule)					- 127.2 -
Previous Engineering changes related to the 10 deleted aircraft (Engineering)					- 26.2 -13.8
Previous Estimating changes related to the 10 deleted aircraft (Estimating)					- 39.5 -20.8
Reduced spares requirement related to reduced aircraft buy (Support)					- 50.9 -28.4
TOTAL Procurement Cost Change					\$-1,002.9 \$-574.3
CONSTRUCTION					
Revised escalation indices (Economic)					\$+ 4.3 \$ -
TOTAL PROGRAM COST CHANGE					\$- 977.1 \$-558.3

1/ Summary explanations of "Previous Changes" are not shown in this example but are required in actual practice.

TABLE VI.12

Selected Acquisition Report

System: B-X

As of Date: 31 December 1979

H. BUDGET YEAR AND OUT YEAR PROGRAMS

Fiscal Year	Current Estimate			Escalation (Base Year FY79)					
	Budget Year Thru Completion			Amount		Rate 1/		Dev	Const
	Dev.	Proc.	Const.	Dev.	Proc.	Proc.	Const.		
1981	927.9	-	-	133.5	-	-	-	6.5	-
1982	409.0	-	-	81.0	-	-	-	6.8	-
1983	39.9	2,024.3	171.8	9.9	610.7	51.8	6.8	6.8	6.8
1984	-	3,448.1	327.2	-	1,182.6	112.2	-	-	6.7
1985	-	5,791.4	-	-	2,205.4	-	-	-	6.4
1986	-	5,079.8	-	-	2,112.6	-	-	-	6.2
1987	-	4,182.1	-	-	1,877.9	-	-	-	6.0
1988	-	915.0	-	-	439.4	-	-	-	6.0
	\$1,376.8	\$21,440.7	\$499.0	\$224.4	\$8,428.6	\$164.0			

1/ Since the annual rates shown do not incorporate spend-out rates or the compounding effect of prior years' escalation, they cannot be used to track the inflation amounts shown for applicable years.

APPENDIX B
COST DEFINITIONS

Figures B-1 and B-2 display the cost element, appropriation, and MIL-STD 881(A) (reference (e)) Work Breakdown Structure Components of all cost definitions required for SAR preparation. The figures have been adapted from and are consistent with the detailed definitions contained in DoD Instruction 5000.33 (reference (c)).

FIGURE B-1

DISCRETE COST DEFINITIONS * (Shaded areas are excluded from definitions)

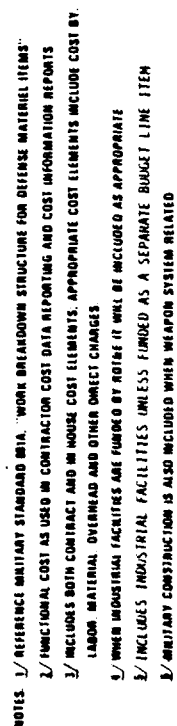
TERM	COST CATEGORIES					APPROPRIATIONS					WORK BREAKDOWN STRUCTURE				
	RESEARCH & DEVELOPMENT		PRODUCTION		OPERATING & SUPPORT	RDT&E	PROD	MILCON	O&M	OTHER	MAJOR SYSTEM COMPONENT SYSTEM/PROJECT MANAGEMENT SYSTEM TEST AND EVALUATION	TRAINING SPECIAL SUPPORT EQUIPMENT DATA OPER./SITE ACTIVATION	INITIAL SPARES & INITIAL REPAIR PARTS	INDUSTRIAL FACILITIES PRG	
	NON RECURRING	RECURRING	NON RECURRING	RECURRING											
DEVELOPMENT COST	\$	\$				\$				1/	\$	\$		1/	
1/ PLANTWAY COST			\$	\$			\$				\$				
WEAPON SYSTEMS COST			\$	\$			\$				\$	1/ \$		2/	
PROCUREMENT COST				\$			\$				\$	\$	\$	2/	
2/ PROGRAM ACQUISITION COST	\$	\$		\$		\$	\$	\$			\$	\$	\$		

NOTES:

1. GENERIC TERM DEPENDS UPON COMMODITY. CAN ALSO BE CALLED "MOLLAWAY" OR "TALLAWAY"
2. ALSO KNOWN AS "ACQUISITION COST" OR "PROGRAM COST"
3. INCLUDES SHIPBUILDING AND CONVERSION. MANY APPROPRIATION
4. O&M AND OTHER APPROPRIATIONS AND FUNDS ARE INCLUDED AS APPROPRIATE
5. WHEN INDUSTRIAL FACILITIES ARE FUNDED BY RDT&E IT WILL BE INCLUDED AS APPROPRIATE
6. GENERALLY OTHER PROGRAM PECULIAR WBS ELEMENTS I.E. FLIGHT SUPPORT OPERATIONS AND SERVICES FOR SPACECRAFT
7. APPLY WHEN PROCUREMENT SUPPORTED
8. EXCLUDES INDUSTRIAL FACILITIES WHEN FUNDED AS A SEPARATE BUDGET LINE ITEM

* ADAPTED FROM DOD INSTRUCTION 5000.33
"UNIFORM BUDGET/COST TERMS AND DEFINITIONS"

COST DEFINITION DISPLAY *



* ADAPTED FROM DOD INSTRUCTION 5000.33

"UNIFORM BUDGET/COST TERMS AND DEFINITIONS"



DEPARTMENT OF DEFENSE
PUBLICATION SYSTEM
CHANGE TRANSMITTAL

OFFICE OF THE SECRETARY OF DEFENSE
Assistant Secretary of Defense
(Comptroller)

CHANGE 1
DoD Guide 7000.3-G
October 31, 1980

SELECTED
ACQUISITION
REPORTS

The Deputy Assistant Secretary of Defense (Management Systems), OASD(C), has authorized the following pen and page changes to DoD 7000.3-G, "Selected Acquisition Reports," issued May 20, 1980:

PEN CHANGES

Page vi, Table of Contents - add after "Appendix B" and before "Figures" the following:

"Appendix C - SAR REVIEW CHECKLIST C-1"

PAGE CHANGES

Insert: New Appendix C, pages C-1 through 12 immediately following page B-3 at the end of the Guide

EFFECTIVE DATE

This Change 1 to DoD 7000.3-G is effective immediately.

C. J. Williford

C. J. WILLIFORD, Director
Correspondence and Directives
Washington Headquarters Services

Attachments
a/s above

APPENDIX C
SAR Review Checklist

To aid in the preparation and review of the SAR, the following SAR review checklist has been developed. The checklist structure parallels the SAR formats in that each page of the checklist contains review items for each of the SAR formats. The checklist items are consistent with the requirements provided both in DoD Instruction 7000.3 and this guide. For each checklist item, the major functional review responsibilities are provided, i.e., Comptroller, Test & Evaluation, Program Analysis and Evaluation and Research and Engineering. The review responsibilities represent only those of the staff offices within the Office of the Secretary of Defense. Since the review responsibilities for each Military Department vary, each Military Department should develop the review responsibilities analogous to this one but unique to their own organizational structures.

FORMAT A | REFERENCE PAGE

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
1. Program Designation, Nomenclature, Popular Name and Mission, and Description are current and consistent with RDT&E Descriptive Summaries and Congressional Data Sheets.	✓			✓	
2. Related programs are identified and clearly related to the SAR program.	✓			✓	
3. Program Managers date of assignment is shown along with his/her name.	✓				
4. References are clearly and accurately presented. If a new document is referenced or an old one has been updated, a copy of the document is being submitted with SAR.	✓				
5. Contractor Name, Division, and Plant Location, DoD Component and responsible office are clearly identified.	✓				
6. All changes since last report are specific, trackable and understandable.	✓				
7. Format is in accordance with DoD Instruction 7000.3 and other guidance format changes (if any) and other special instructions issued/received since last report have been incorporated.	✓				

FORMAT B SUMMARY PAGE

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PAGE	R&E	
1. Program highlights adequately summarize significant developments since program inception and detail the major events and changes since the previous report.	✓	✓	✓	✓	
a. Address significant developments as discussed in RDI&E Summaries and Congressional Data Sheets to include:	✓	✓	✓	✓	
(1) Changes requiring reprogramming approval.	✓			✓	
(2) Changes resulting from Defense Systems Acquisition Review Council's (DSARC), Secretary of Defense Decision Memoranda (SDDM), or other Secretary of Defense approvals.	✓		✓	✓	
(3) I&E results that dictate additional testing which delays planned procurement.		✓	✓	✓	
(4) Failure to complete planned testing prior to DSARC decision.		✓	✓	✓	
(5) Significant DI&E, IOI&E, and OI&E results.		✓	✓	✓	
(6) Contract Activity, including awards, major changes, and significant claims.	✓			✓	
b. An assessment of the extent to which the system is expected to satisfy <u>current</u> mission requirements is provided and those areas where the system will fall short are identified.		✓	✓	✓	
2. Date of latest SDDM, or number and date of the approved Decision Coordinating Paper (DCP) (if applicable) is identified.				✓	
a. Submission date to OSD and current status of any formally submitted draft DCP or DCP change are identified.				✓	
b. Program thresholds which have been breached or estimated to be breached are shown.		✓	✓	✓	
c. The means by which OSD was notified of an actual or potential threshold breach is indicated.				✓	

FORMAT B | SUMMARY PAGE

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
3. Format is in accordance with DoD Instruction 7000.3 and other guidance. Format changes (if any) and other special instructions issued/ received since last report have been incorporated.	✓				

FORMAT C | TECHNICAL SECTION

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
1. Those characteristics for which SDDM or approved DCP <u>thresholds</u> exist, the principal performance requirements of the contract, and meaningful characteristics pertaining to key subsystems are identified.		✓	✓	✓	
a. DE or Baseline values as well as approved program values reflect <u>goals</u> rather than thresholds.			✓	✓	
b. Demonstrated performance values are reported on a timely basis and reflect the data obtained from the approved program I&E plan.		✓	✓		
2. The addition/deletion of data elements are handled in accordance with the procedure stated in section 2-5, paragraph b. of this Guide.	✓				
3. If variance analysis is included here, significant variances between DE and CE are explained. All changes to this section are clearly identified.		✓	✓	✓	
4. All changes made since last report are specific, trackable, and understandable. The effect of each change is reflected on other parts of SAR and consistency exists throughout report.	✓	✓	✓	✓	
5. Figures and statements which are used more than once in the report are consistent.	✓	✓	✓	✓	

FORMAT D | SCHEDULE SECTION

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
1. Characteristics for which SDDM or approved DCP thresholds exist as well as those included in the RDT&E Descriptive Summaries are identified.	✓		✓	✓	
a. All baseline and approved program values are in terms of <u>goals</u> rather than thresholds.			✓	✓	
b. Milestones encompass entire period from program initiation (i.e., 1st year of funding encompassed by the program acquisition cost displayed in Format E) through award of first full-scale production contract and Initial Operating Capability (IOC).	✓		✓	✓	
2. Definition of IOC is clearly stated.			✓	✓	
3. The Units Accepted To Date section includes the advanced development and engineering development quantities to the extent these are included in the Program Acquisition Cost estimate.			✓	✓	
a. The planned values reflect the units scheduled to be accepted under the current plan.			✓	✓	
b. The actual values reflect the units accepted to date.			✓	✓	
4. The addition/deletion of data elements are handled in accordance with the procedure stated in section 2-5, paragraph b. of this Guide.	✓				
5. If variance analysis is included here, significant variances between DE and CE are explained. All changes to this section are clearly identified. Explanations are clear, precise, and informative.			✓	✓	
6. All changes made since last report are specific, trackable, and understandable.	✓		✓	✓	
7. The effect of each change is reflected on other parts of SAR and consistency exists throughout report.	✓		✓	✓	

FORMAT E PROGRAM ACQUISITION COST

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PAGE	R&E	
1. Development costs are accumulated from the point the system was designated, either as a program element or major project within a program element.	✓		✓	✓	
2. Column 3, the Current Estimate, is the total Acquisition Cost of the latest DoD-approved program.	✓		✓		
a. For December 31 SAR, CE agrees with the President's budget and supporting documentation to include:	✓		✓	✓	
(1) FYDP	✓		✓		
(2) RDT&E Descriptive Summaries	✓			✓	
(3) Congressional Data Sheets	✓			✓	
(4) Senate Appropriations Committee Program Data Book	✓			✓	
b. March 31, June 30, and September 30 submissions reflect latest and best estimate of cost of latest DoD-approved program.	✓		✓		
3. Following items are reviewed to ensure consistency with program approval documentation:					
a. Program quantities reflect total inventory objective or DoD-approved units.	✓		✓		
b. Unit costs are properly calculated.	✓		✓		
c. Design-to-cost goals are accurately reflected and based on latest official program documentation. All entries are expressed in average unit flyaway.	✓		✓	✓	
d. Substantiate Foreign Military Sales (FMS) cases against approved DD Form 1513 (Offer and Acceptance). Applicable schedule and cost impact of FMS on DoD programs are reflected in Format G Cost Variance Analysis.	✓		✓	✓	
e. Total program cost in column 3 is identical to funding total in column 8. This total is also identical to total in Format G.	✓		✓		

FORMAT E	PROGRAM ACQUISITION COST
----------	--------------------------

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
f. Total quantities in column 3 are identical to total quantities in column 8.	✓		✓		
g. Budget year amount by appropriation, column 5, is supported by the Congressional budget submission.	✓		✓		
h. Funding data in columns 5, 6, and 7 reconciles and tracks to Format H, Budget and Outyear Funding Program.	✓		✓		
4. All changes made since last report are specific, trackable, and understandable. The effect of each change is reflected on other parts of SAR and consistency exists throughout report.	✓		✓		

FORMAT F	CONTRACTOR COST
----------	-----------------

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
1. Six largest contracts valued in excess of \$5 million are reported.	✓			✓	
2. Each contract is identified by:	✓			✓	
a. Contract number	✓			✓	
b. Contract type	✓			✓	
c. Contract date	✓			✓	
d. Whether letter or definitized	✓			✓	
3. The Government's Estimate, column 3, shows parenthetically the total dollar value of the planned changes as yet unauthorized to the contractor.	✓			✓	

FORMAT G | VARIANCE ANALYSIS

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	P&E	R&E	
1. Variances:					
a. Summarize explanation of changes between DE and CE.	✓		✓	✓	
b. Detail explanation of identified changes since previous report.	✓		✓	✓	
c. Are explicitly stated, understandable, and informative.	✓		✓	✓	
d. Identify any estimate that will breach a SDDM, DCP, or other OSD threshold.	✓	✓	✓	✓	
e. Describe the nature of problems.	✓	✓	✓	✓	
f. Provide immediate program impact.	✓	✓	✓	✓	
g. Provide impact on total program.	✓	✓	✓	✓	
h. State any corrective action.	✓	✓	✓	✓	
i. Are commensurate with degree and severity of variance.	✓	✓	✓	✓	
2. Cost Variance Analysis:					
a. Is calculated according to the directed order.	✓		✓		
b. Properly fits the cost variance category.	✓		✓		

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PAGE	R&E	
1. Program acquisition cost and escalation applicable to budget year and balance to complete segments of CE are provided by fiscal year and the escalation amount is derived using the OSD rates as reflected in the program acquisition section.	✓		✓		
2. Entries agree with the amounts reported in columns 5, 6, and 7 of Format E, Program Acquisition Cost.	✓		✓		
3. Changes since previous report and changes in rates previously reported for prior fiscal years are clearly explained and footnoted.	✓		✓		

FORMAT I | COST-QUANTITY CURVES

CHECKLIST ITEM	REVIEW RESPONSIBILITY				REMARKS
	COMP	T&E	PA&E	R&E	
1. Total flyaway cost, including both non-recurring and recurring costs, is displayed on this format; data tracks and reconciles to Format E of SAR.	✓		✓		
2. Where costs are separately computed for more than one end item of equipment, a cost-quantity curve for each end item is provided. A cost-quantity curve for each hardware item under flyaway is also submitted, i.e., airframe, engine, and avionics, which make up an aircraft.	✓		✓		
3. The cost-quantity curve is a unit curve.	✓		✓		
4. All axes and data are clearly labeled.	✓		✓		
5. Whenever there is a change in flyaway cost for the program (excluding quantity changes) of 10% or more since the last curve update, an updated curve is submitted.	✓		✓		